JUNE 1957
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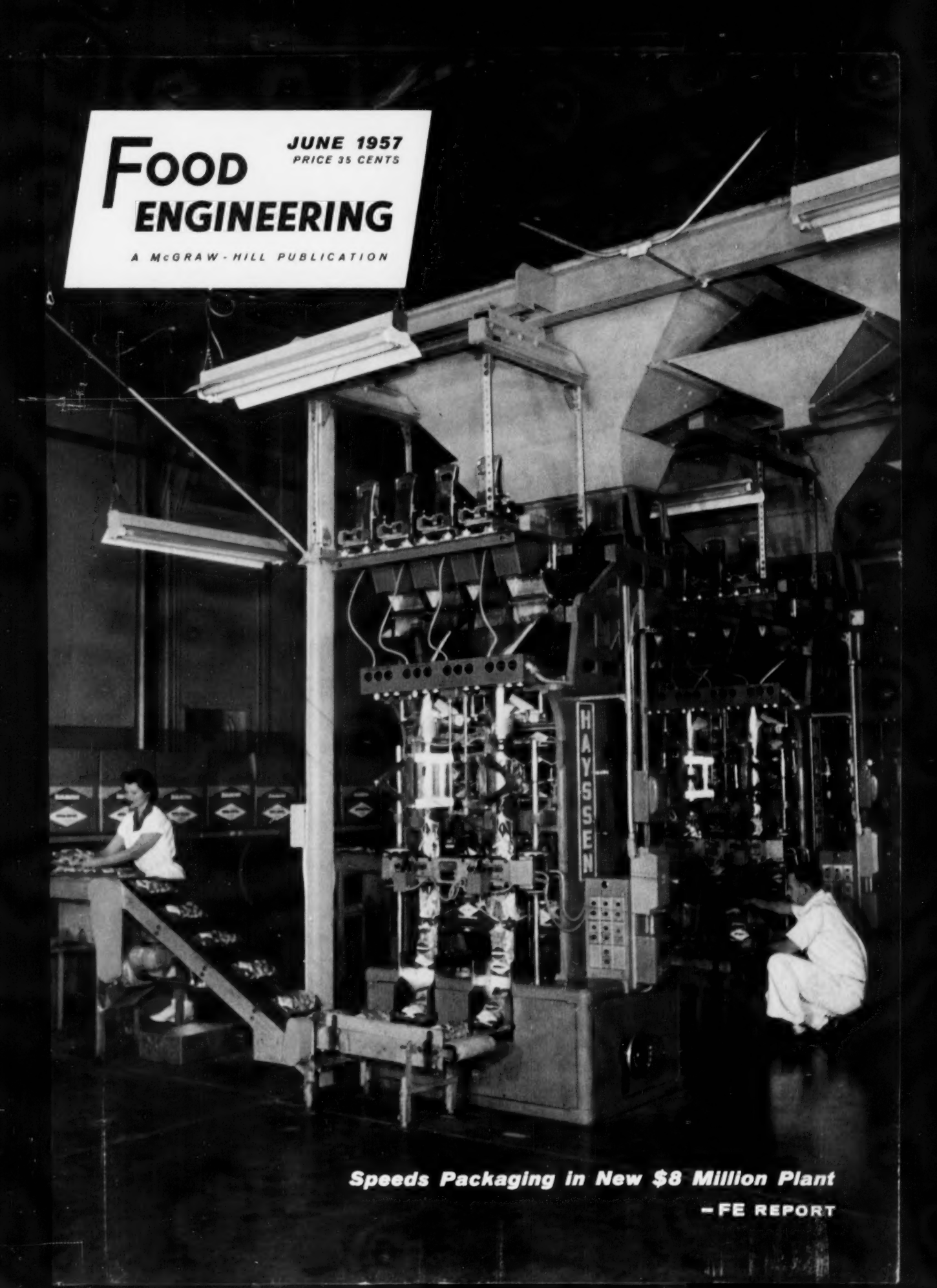
FOOD ENGINEERING

A McGRAW-HILL PUBLICATION



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– FE REPORT

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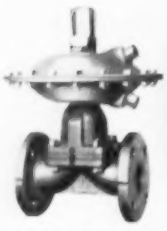
Grinnell Air Motor, Spring Loaded



Grinnell Air Motor, Double-Acting

Grinnell Piston

Hammel-Dahl Close-Coupled

Hammel-Dahl Preloaded

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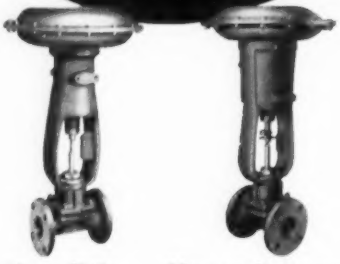

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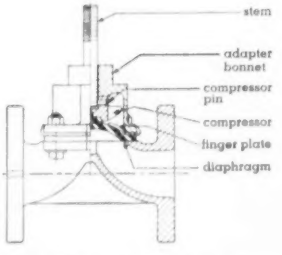

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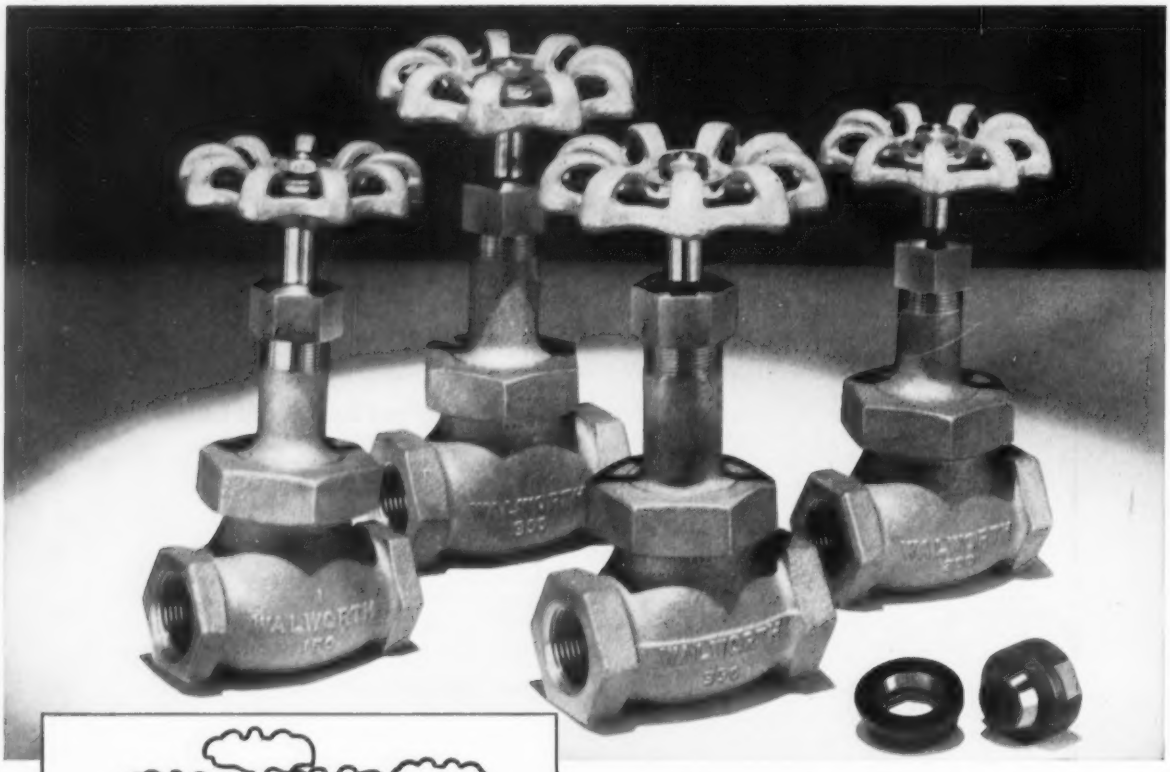

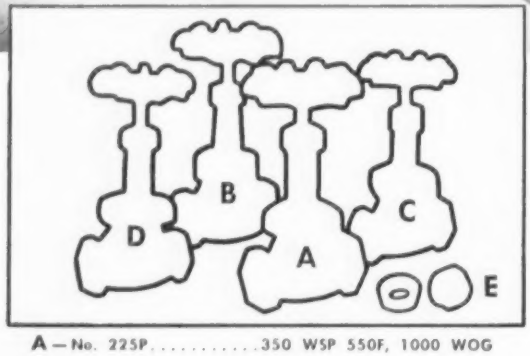

A — No. 225P.....350 WSP 550F, 1000 WOG
B — No. 260P.....300 WSP 550F, 600 WOG
C — No. 245P.....200 WSP 550F, 400 WOG
D — No. 237P.....150 WSP 500F, 300 WOG
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Walworth offers four lines of Bronze Globe Valves with stainless steel, plug-type seats and discs. Advantages of these valves include:

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• **Bodies,** made of Composition M bronze (ASTM B61), have ample wall thickness to provide high safety factor.

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Here's Herb Powell

—busy eagle-eyeing copy for the next FE. In final checking and shaping of articles, he applies No. 1 quality control, much as you do in your food plant.

Finished copy must be right. Otherwise, it won't get the nod from this highly discriminating managing editor. He sees that our features say just what's to be said in "shortest travel"—top-graded information minus stems or slivers.

Look closely and you'll note he's already blue-penciled the first half of that sheet before him. What was said fell short. To him that meant "out"—to save space for what really is pertinent. And Herb regularly rephrases and reorganizes "solid" information to make it come off the printed page faster.

In truth, many an article has been transformed from middling to A-1, under his thorough hand. And so we often think of Herb as the "hidden byline."

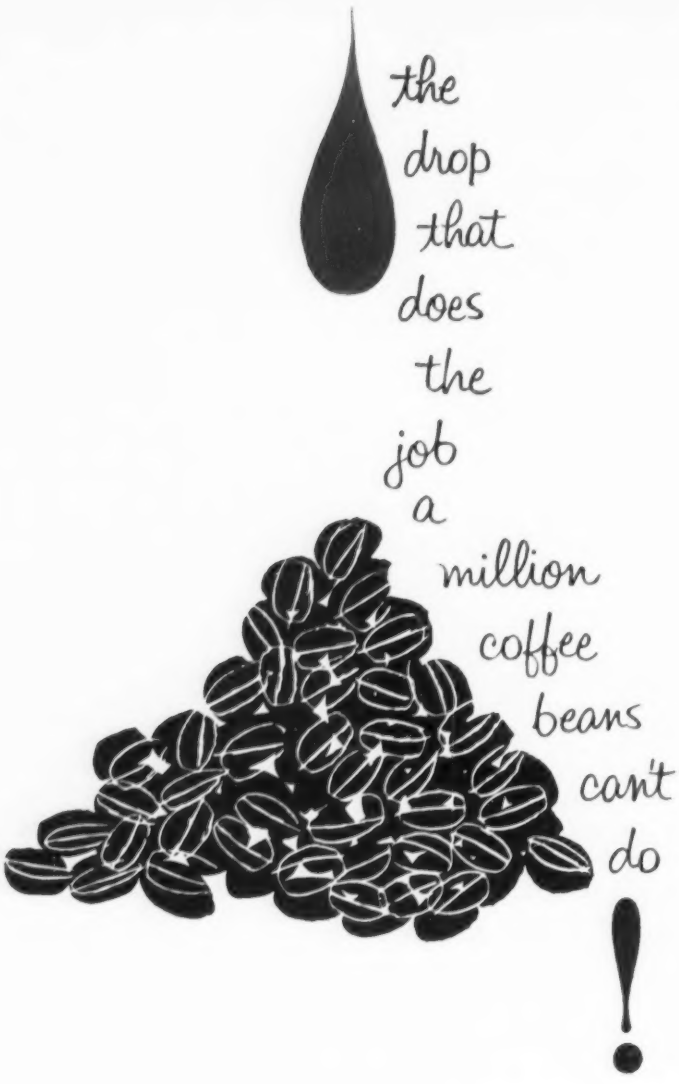
This is only part of it. For if you look here a minute later, you'll likely find him gone—maybe to Production to guide the shaping of a layout, maybe to Illustration to see that a flowsheet is going right.

Or he may be over helping a junior editor "get on target." For Herb handily doubles his know-how with show-how.

Call him an editor's editor. As a long-experienced professional in the handling of both science and industrial publications, he's been in the forefront on editorial techniques for many years. Around ten right here with us.

Herb looks upon his assembling of FE ingredients as a modern packaging job. "We lay emphasis," he points out, "on making it a convenience package—or to paraphrase a QM ration-tag, 'Informational Meal, Ready to Eat.'"

As he says, it's our goal to make each issue of FE a sharp, handy tool with which you can improve your operations. And Herb recommends that you turn to "How to Use FE," over on p. 117.



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TRENDS & FORECASTS

Special

FOOD ENGINEERING

Service to Executives

Food and beverage manufacturing capacity increased 5% in '55-56. It is expected to go up 6% in '56-57 and 9% for the '57-60 period, the McGraw-Hill survey of capital expenditures indicates. Capacity in '60 will be 45% over '50.

Sixty percent of the $913 million of capital expenditures by food manufacturers this year will go for modernization. Forty percent is for expansion. In '58-60, only 29% is slated for expansion.

Our industry was operating at 80% of capacity at the end of last year, against a preferred operating rate of 90%.

Increases in capital expenditures for major branches of the food industry in '56-57 are topped by 26% for flour milling. Others are: Baking, 21%; canning and brewing, 17%; dairy, 16%; meat, 7%. Average for the industry is 14%.

Expenditures for research and development in the food and kindred products field totaled $66.7 million in '55, $76 million last year, and is estimated at $85.1 million this year. Planned for '60 is $96.2 million.

Seven percent is the estimated increase in employment of scientists and engineers in food and beverage industry in '56-57; and 11% in '57-60. These figures compare with 7% and 15% for all manufacturing.

Increased capital spending for new products this year is indicated by 11% of food and beverage manufacturers. In 1960, 7% of sales is expected to be in new products.

Another Berry Bust?

Undaunted by the heavy '56 carry-over, California strawberry freezers are gearing production for another bumper year. At least two new freezing plants (total 5-lines)—plus a number of improved facilities in other plants—have been readied for full production.

Growers may be on the spot if prices for berries plummet to an estimated 8¢ per lb., compared to 12-15¢ lb. in '56.

Mixed Outlook for Crops

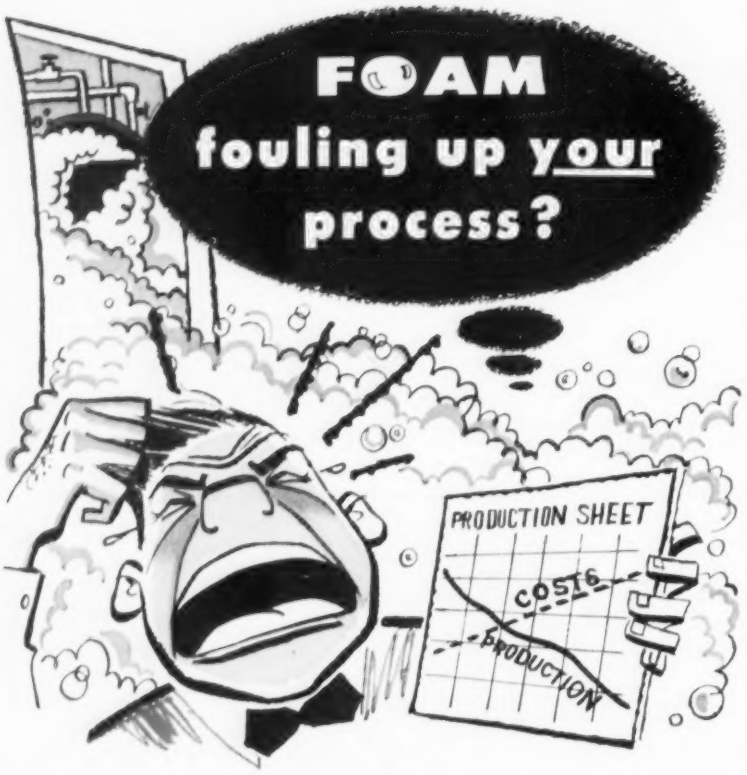
At mid-year, the outlook for some canning crops is good. For others, reduced production is indicated.

For sweet corn, a 3% drop in acreage to be planted for processing has been forecast. USDA's crop reporting board estimates 1957 planted acreage at 461,800. This compares with 474,380 acres planted last year and the 1946-55 average of 483,570. Normally, about 6% of planted acreage is abandoned before harvest time.

Earmarked for canning is 398,000 acres, 3% less than last year. Indicated acreage for freezing is 63,500, off 2% from 1956.

Snap bean acreage this year will be about 150,000, 7% larger than last year and about 14% above the previous ten-year average. The 115,130 acres of snap beans due for canning and other (non-freezing) processing is an 8% increase over 1956. The 35,000 acres indicated for freezing is 3% more than last year.

Sauerkraut cabbage acreage to be



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Trends & Forecasts

contracted for in 1957 is expected to total about 8,900—down 11% from last year and off 4% from the ten-year average. Sharp declines in Ohio and Wisconsin account for most of the drop.

Green pea acreage planted for processing is expected to run about 3% under last year's 501,860 acre total. But the crop reporting board notes that acreage intended for canning—about 75% of the total—should exceed last year's level by 2% and top the 1946-55 average by 1%. On the other hand, acreage planted for freezing is expected to be off 14% from 1956.

Beet acreage planted for canning in 1957 probably will be off about 7% from last year's 21,350 total. Wisconsin, largest of the four major producing states, shows the sharpest drop, 11%. Despite the decline, this year's indicated 19,840 acre total will exceed the ten-year average by about 2,300 acres.

Tomato acreage planted for processing will be off sharply when 1957 totals are in, says the crop reporting board. Looked for is a 313,350 acre crop—about 11% below 1956 and 20% under the ten-year average.

Pickle packers can expect a 10% rise in plantings of cucumbers for pickles, if early season prospects pan out. That would bring 1957 plantings to about 139,350 acres. This figure is not far behind the 145,300 ten-year average, and a solid gain over last year's 126,340 acre total.

Beer Barrels Roll Slowly

Progress comes hard in the brewing industry. Total production of malt liquor crept up slightly to 90,335,985 bbl. last year—from 90,284,699 bbl. in 1955. It lagged behind the population gain for a slight per capita slip. The pattern has been similar for the past decade.

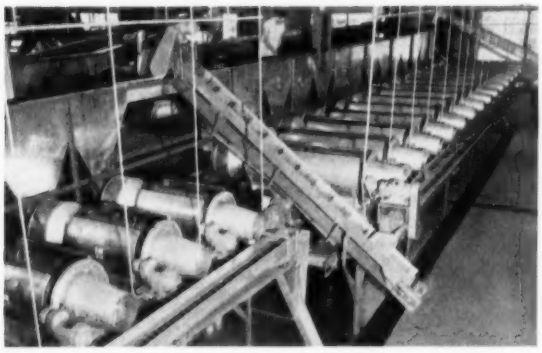
There is a long-standing trend to increased sales of packaged beer in grocery stores for home consumption. But even this trend has slowed to a crawl. In 1956, sales on the packaged product amounted to 67,088,826 bbl., a gain of less than 1½% over the 66,178,580 bbl. figure of 1955.

There is hope around the corner, however. For the past 10 years the best beer drinkers, young adults, have been proportionately low in number. However, an increase in the 21-year-olds is coming in the next year or two.

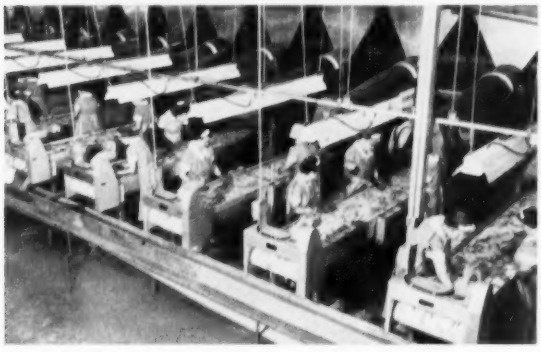
It long has been obvious that beer

fmc GRADERS AND SNIPPERS

This season the more profitable green and wax bean lines will be operating this new equipment



Battery of 14 Double and 4 Single FMC Pregraders handles huge continuous volume of whole beans at *Northwest Packing Co's.* new Portland, Oregon, plant.



FMC Bean Snippers employ an oscillating knife system that assures maximum snipping efficiency, maintains even drum and knife wear.

FMC Continuous Bean Graders and Snippers offer a profit-making potential in long-term, high capacity and trouble-free operation that can be matched by no other equipment.

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- Packaging Machinery
- Food Processing
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- Drives for Electronic Power Supplies
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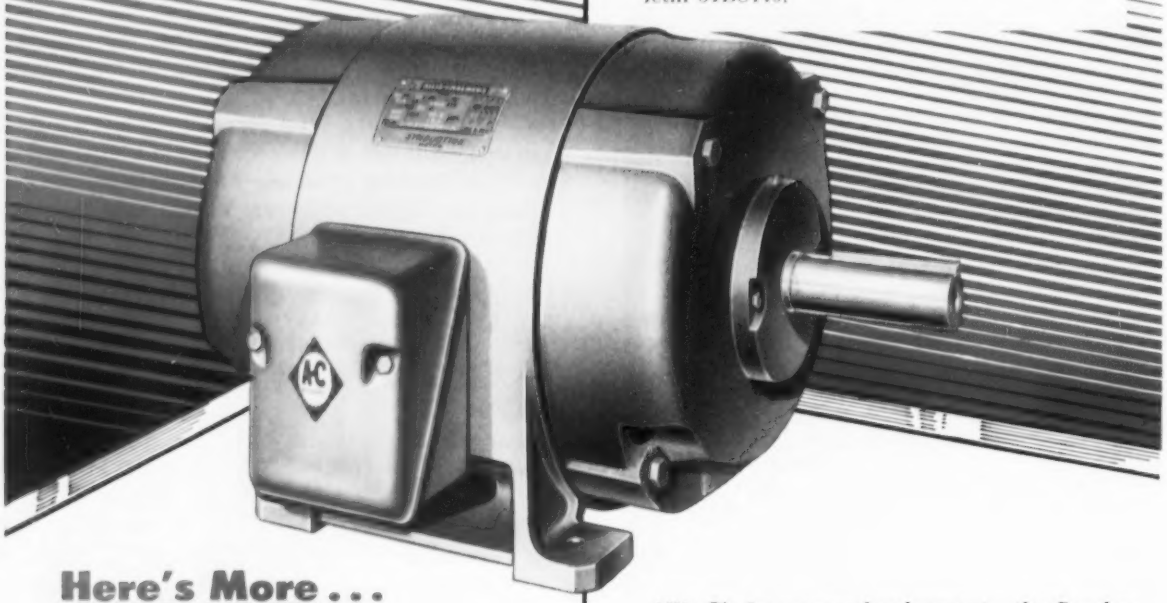

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ALLIS-CHALMERS

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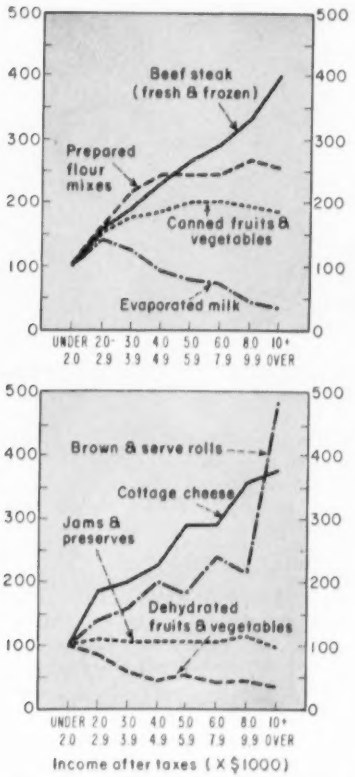
with the traditional bitter taste could never become America's "national beverage." So the leading brews have been made "light," mild, and low-calorie. Weber Waukesha (Wis.) Brewing Co. has even come up with an alcoholic malt beverage in cola, cherry, punch, and Collins flavors—beer for people who don't like beer. It will take time to tell whether this approach is one way to make malt liquor more popular.

In the battle of the beers, the number of breweries has declined from 750 in 1935 to 237, with 34 closing shop last year. Ten firms do 42% of the business today, and one market researcher predicts that 10 will have 70% of the sales by 1965.

National brewers have built branch plants to cut shipping costs, and the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Canned fruits & vegetables
Evaporated milk
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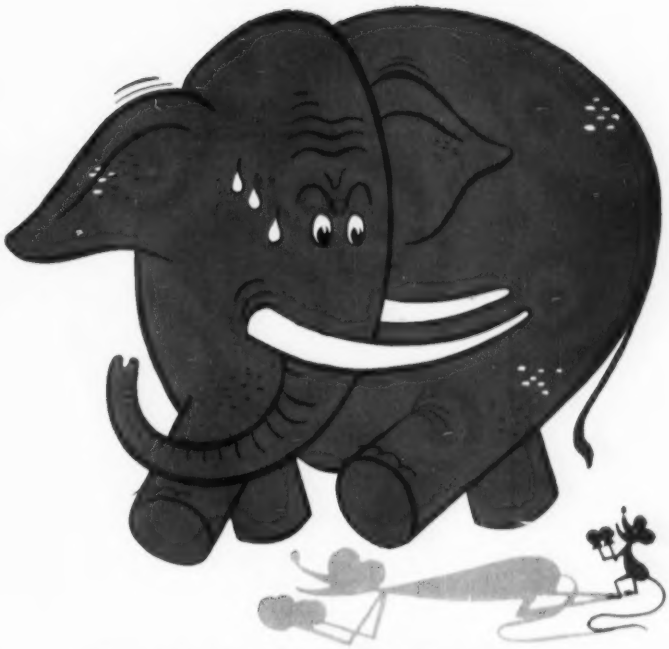
Income after taxes (X $1000)

INCOME SHAPES EATING in highly significant manner. Consumption of expensive but tasty items like steak—and of convenient, but more costly, foods such as prepared mixes—shoots up sharply as family's disposable income rises. Wide range is shown by these selected USDA curves. Poundage consumption index of 100 is for households with incomes below $2,000.



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PARTLOW TEMPERATURE CONTROLS are built to withstand rough usage, but they're also extremely sensitive to slightest temperature changes. They'll take a lot of punishment without upsetting their accuracy and precision.

If your process requires precise temperature control in the –30°F to 1200°F range, you can do it better . . . *and at lower cost* . . . with Partlow Controls.

They're less complicated than thermocouples. Thick-walled capillaries and seamless tubing assure almost indefinite life. Elements can be replaced on the spot.

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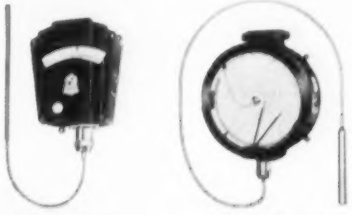

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Indicating Temperature Control

MODEL RS
Recording Temperature Control

partlow
the pioneer in mercury thermal controls

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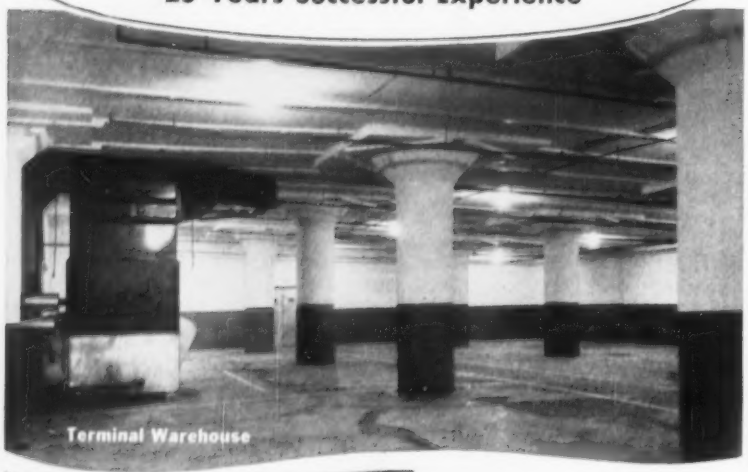
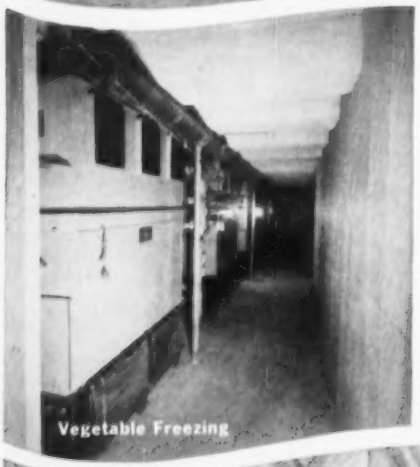
25 Years' Successful Experience



Terminal Warehouse



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Always full capacity

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Write for Niagara Bulletin 105

Fruit Pre-cooling and Storage

NIAGARA BLOWER COMPANY

Dept. FI-6, 405 Lexington Ave., New York 17, N. Y.

District Engineers in Principal Cities of U. S. and Canada

Trends & Forecasts

leading ones have been gaining a little in sales volume.

Surprisingly, though, some of the regional companies have been gaining faster.

Here are the ten leading brewing companies and their 1956 sales (in thousands of barrels: (1) Schlitz, 5,940; (2) Anheuser-Busch, 5,865; (3) Ballantine, 3,966 (est.); (4) Falstaff, 3,870; (5) Hamm, 3,324; (6) Liebmann, 3,250 (est.); (7) Pabst, 3,200 (est.); (8) Carling, 2,996; (9) Schaefer, 2,710 (est.); (10) Stroh, 2,708.

HORS D'OEUVRES

▶ In 54 A.D., Nero ate sherbet made by mixing snow from the mountains with fruit juices, pulp, and honey. No wonder he fiddled so cooly while Rome burned.

▶ Armour is promoting Treet luncheon meat with three nips of French perfumes in a multiple pack. Gives the little woman two ways to her man's heart.

▶ Fear-diet hullabaloo about fats has not reduced their sales so that one of the larger food chains can notice it. Apparently, laymen don't scare so easily as some scientists.

▶ Kroger's new super super in Toledo carries gourmet items—like pickled rooster combs and chocolate coated ants. Makes sense to offer extraordinary foods to the extraordinary pocketbooks of today's well eating masses.

▶ What with ants trying to get into our foods since time immemorial, that chocolate coating ideas serves them right.

▶ Tears of mourners were caught in glass containers 4,000 years ago. And even today a lot of people weep into their beer glasses.

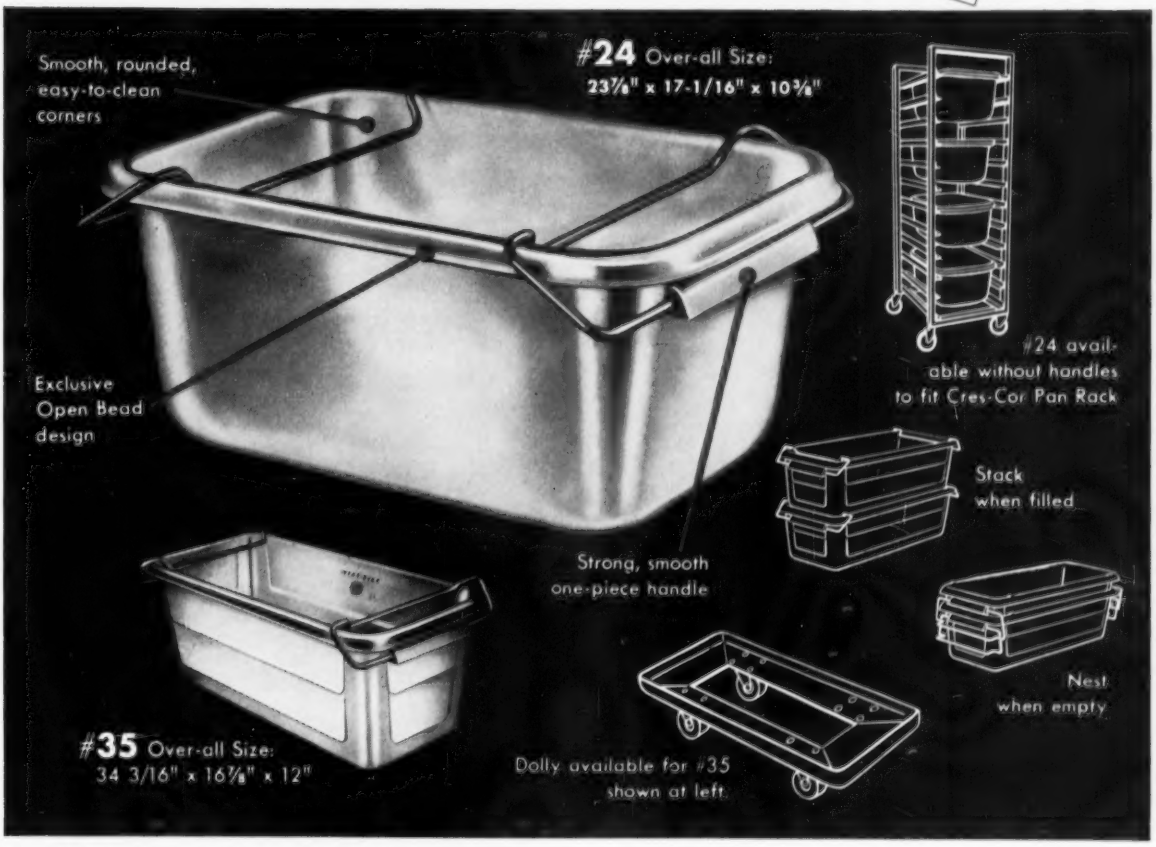
▶ Just 1 ppm. of the new gibberellic acid in a spray will stimulate a plant to grow two or three lengths in weeks. That's putting Malthus in the shade.

← For more data, circle this page number on card at back

now . . . handy smaller size . . . new features

Tote Boxes

by WEAR·EVER


Smooth, rounded, easy-to-clean corners
#24 Over-all Size: 23⅞" x 17-1/16" x 10⅜"
#24 available without handles to fit Cres-Cor Pan Rack
Exclusive Open Bead design
Stack when filled
Strong, smooth one-piece handle
Nest when empty
#35 Over-all Size: 34 3/16" x 16⅞" x 12"
Dolly available for #35 shown at left.

You asked for it . . . a smaller version of the famous Wear-Ever #35 Tote Box. It's our new #24, shown at top in the above illustration, and it's available *now*.

We've designed it particularly for you whose needs call for a lighter, smaller, easier-to-handle container. It is available without handles, to fit perfectly in a Cres-Cor pan rack.

This new box incorporates the same quality construction features as our standard size box—special extra hard wrought Wear-Ever Aluminum Alloy, sanitary open bead and extra strong, double-embossed bottom.

Like its big brother, shown in the smaller photo, this new box stacks when full, nests when empty and is available with your identifying imprint on side or end, if desired.

For full information on our complete line of food handling items, call your local Wear-Ever man, or send coupon below.

WEAR·EVER
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UTENSILS

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WEAR-EVER BLDG., NEW KENSINGTON, PA.

The Aluminum Cooking Utensil Company, Inc.
306 Wear-Ever Bldg., New Kensington, Pa.

Gentlemen: I'd like to know more about your Tote Boxes and other handling equipment.

☐ Send me your catalog. ☐ Have your representative see me.

Name .....

Title .....

Fill in, clip to your letterhead and mail today.

NEW ITEM! *Wear-Ever's new Metal Scouring Cloth. Won't scratch, won't mar, far outlasts ordinary scouring cloths. At your dealer's.*

For more data, circle this page number on card at back →

A HEALTH *plus* ON YOUR LABEL

● Every meal she sets on her table must meet two basic requirements . . . it's like second nature to her: a meal must be *appetizing* and *health-providing*. With these goals in her subconscious, what happens in the store?

The grocery store is the proving ground of competition. *Hundreds of powerfully advertised brand names compete for her favor*, for her judgment of what will provide appetizing, health-providing meals. That's when your food product needs *a plus on the label*, a signal to her health-consciousness!

"Vitamin Enriched," "Vitamin Fortified." Those signals, those words can make a big difference today in moving *your product* to her table. Why not let a Pfizer representative tell you *in his words* the full details on how Pfizer vitamins can significantly increase your product's sales potential. Pfizer has been a major vitamin research and production center since the first vitamin was commercially produced.

Here are just 3 examples of food products that are increasing sales with Pfizer vitamins:

A health plus on the label of carbonated beverages says "Vitamin Fortified" *(and means sales)*. With Pfizer Vitamin C and Vitamins of the B Complex fortification costs just a fraction of a cent per bottle.

Pfizer experience can help you put the health

← For more data, circle this page number on card at back

MOVES PRODUCTS TO HER TABLE

A health plus on the label of flour, macaroni and similar products says "ENRICHED" *(and means sales)*. New light-color Pfizer BI-CAP is now simplifying the problem of enriching white flour for many millers.

A health plus on the label of canned juices and concentrates says "Vitamin Fortified" *(and means sales)*. Fortification here will offset processing losses and seasonal variations in natural vitamins.

* * *

What's the most powerful *plus* you can offer the food shopper? It's those extra health words on your label. Let Pfizer help you put them there.

Quality Ingredients for the food industry for over a century

Pfizer

CHAS. PFIZER & CO., INC.
Chemical Sales Division
630 Flushing Ave., Brooklyn 6, N. Y.
Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.; Dallas, Texas

plus on your label simply and economically

For more data, circle this page number on card at back →

It's the Nash!

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

- No internal wearing parts.
- No valves, pistons, or vanes.
- No internal lubrication.
- Low maintenance cost.
- Saves floor space.
- Desired delivery temperature Automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

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DEVELOPMENTS TO WATCH

Special

FOOD ENGINEERING

Service to Executives

Revolutionary mill combines impact-in-air and fluid-energy grinding. Used by Pillsbury for high-protein flour, unit has high-speed rotor with radial blades. These blades break up material by impact and set up hurricanes of air that rub particles against each other for fine grinding. Mill works with centripetal air classifier in patent-applied-for process.

Pellets of shortening are broken up and thoroughly mixed with other ingredients by new high-speed machine developed by Strong-Scott. Unit also will fluff dry mixes or disperse 10-30% of liquid in a mix. Overlapping paddles that barely clear mixer wall rotate at high speed to produce strong centrifugal force.

Micro-wave electronic energy speeds freeze-dehydration without melting ice crystals in Raytheon development. This and other technical progress in freeze-drying brings method nearer point of break-through to commercial food applications.

Continuous analytic process control is promised by new colorimetric system of Technicon. Sample is taken continuously, automatically proportioned with reagent, then passed through dializer, mixing tube, and recording colorimeter.

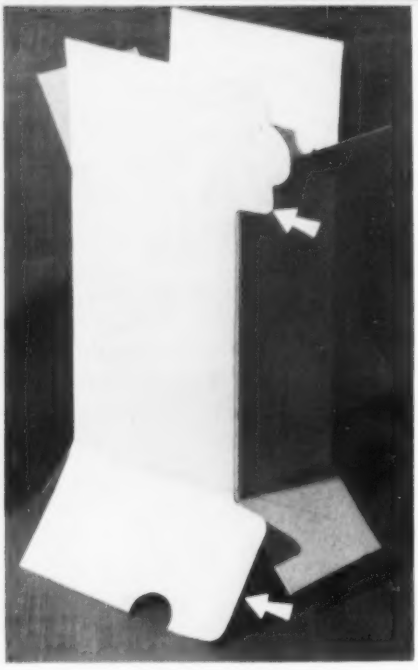
In new self-cleaning plate filter, spent cake is sluiced off with jet sprays and removed by screw conveyor. Developed by Sparkler, filter also has full-access door permitting individual plate replacement.

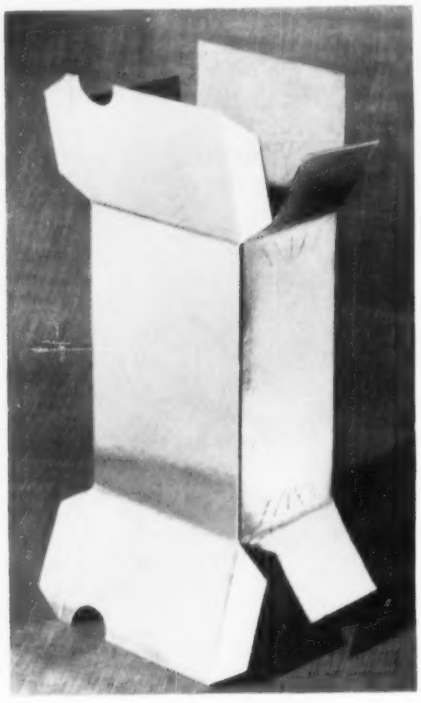
Aluminum cans are formed from metal slugs by impact-extrusion process in automatic can line developed by Aluminum Ltd. Flexible as to container size, unit has made complicated beer cans and small instant coffee containers. Compact operation includes extrusion, finishing, degreasing, internal laquering, coating, and printing.

It is commercially feasible to irradiate liquid egg products to destroy Salmonella bacteria, according to J. T. R. Nickerson, M.I.T. Whipping time is increased, but spray drying lessens radiation off-flavors.

Whole brown rice is being made into ready-to-eat toasted cereal flakes by Battle Creek Food Co. Sugar and salt are added in low-heat process that utilizes complete grain, including bran and germ.

Quick solubility of powders is achieved by atomizing wetting agent onto product as it flows by gravity past spray nozzles. Flavors and vitamins also may be added in new Blaw-Knox unit.





PROTOTYPE for a sift-proof cereal carton (left) has two Van Buren ears (arrows). Their necessity depends on product and type of glue used in seal. Foil-covered container (below) has increased moisture protection, and four tabs to cover flap seals.

Creating The Package

Latest Seal-End Cartons

Sift- and moisture-tight containers are handled at high speeds by new packagers

LATEST AID for food men battling the high cost of packaging is two cartons—sealed with thermoplastic adhesives—that achieve sift-proof and moisture-tight properties without the conventional inner or outer wraps.

And so great is the interest in these containers—and in the new, high-speed packaging machines that exploit their advantages—that there is already some controversy among experts on the following questions:

- Do these units really live up to their product-protective claims?
- Does their initial design represent the most economical construction?
- And will they actually save packaging dollars, despite the high cost of hot-melt glues?

Conclusive answers will have to await the result of tests now being run on the first marketing applications—a pre-cooked cereal and a line of frozen foods.

But, analysis of the known facts can throw a lot of light on the subject.

First, there should be a strong distinction drawn between the terms "sift-proof" and "moisture-tight". Though both of the new packages are formed, fundamentally, by the same technique—the sift-proof container need not be moisture-proof. Indeed, in the cereal pack such a vapor barrier is undesirable, since the product must be fumigated after packaging.

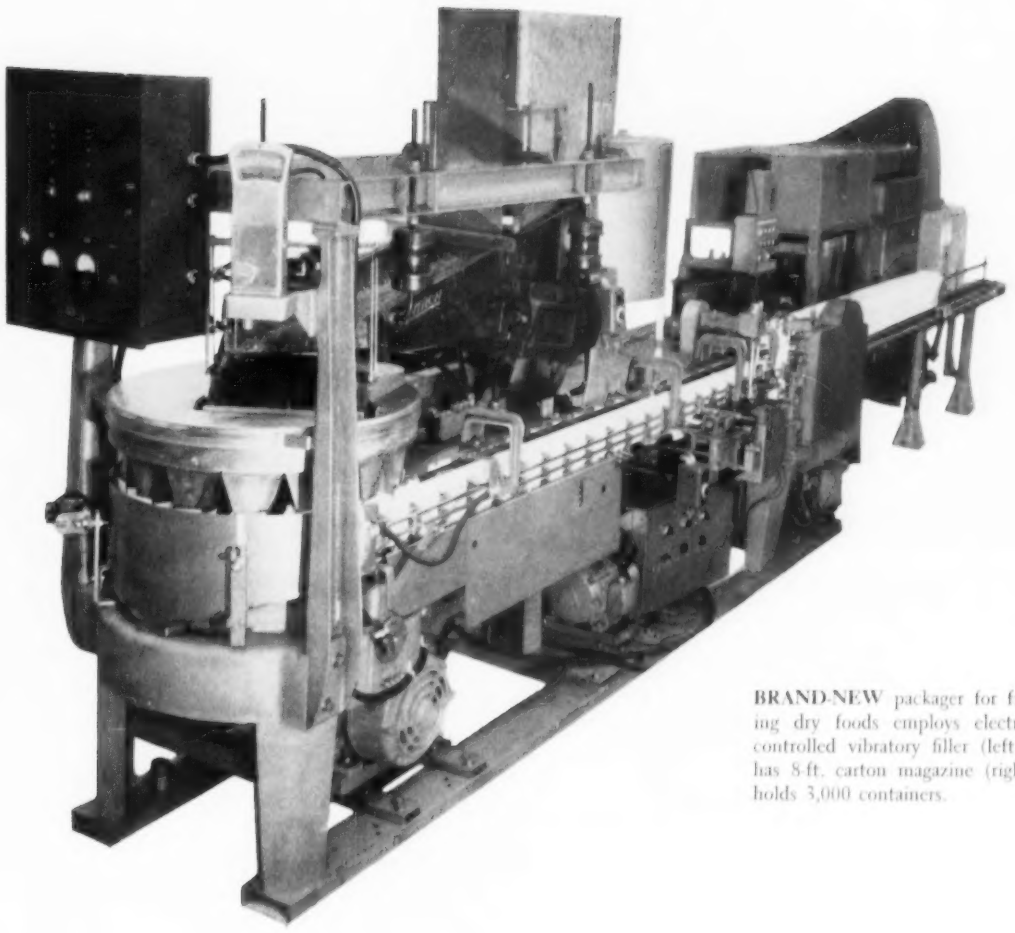
Here, the problem is merely to prevent escape of the product during shelf-life. This has been accomplished with an ingenious combination of design techniques.

The carton (Thermo-Stik, Lord Baltimore Press, N. Y. C.) is a one-piece unit, die-cut from 16-point clay-coated manila-backed board and gravure-printed in four colors.

Sift-Proof Barrier

The secret of construction—according to Lord Baltimore, pioneer firm for this technique—lies in the corners of the containers. Here, the blank is not cut all the way to the flap score-lines. The last 1/32-in. is merely scored.

Thus, when the flaps are folded



BRAND-NEW packager for free-flowing dry foods employs electronically controlled vibratory filler (left). Unit has 8-ft. carton magazine (right) that holds 3,000 containers.

Obviate Overwraps

on the machine, this area tears, forming a minute web-corner containing matted paper fibers. The side-seam flap is even extended into the top and bottom end-flap areas to insure a tear-seal on this corner.

It is reasonable to assume that this special construction does add increased protection—particularly in the case of very fine products, such as flour or powdered sugar—though a few experts say any well-made carton would do as well.

Another point of contention in the cereal package is the use of Van Buren ears—extra tabs on the top and bottom flaps that are folded up and sealed against the package body to cover the flap joints.

In the case of the cereal package, only two are used. One is employed at the top of the carton as part of a special opening and pouring spout. The other was added at the bottom to equalize top and bottom width of the package for a subsequent multi-packing operation. The latter has now been found unnecessary for this purpose, and will probably be eliminated in future packages.

However, the necessity of these extra tabs to provide a sift-proof seal is still debated. Most experts assert that they are probably not needed with thermoplastic glues, except for extremely fine foods, and that they only add to the carton cost.

Factors in Barring Moisture

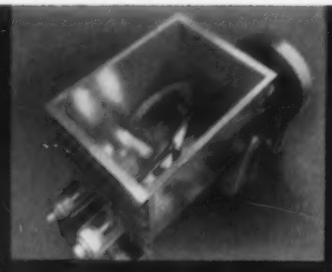
For a truly moisture-proof container, of course, only a thermoplastic glue will fill the bill. Cold adhesives are water soluble, and thus will not provide the necessary barrier to water vapor.

But there is another consideration in this type of package, too: The material from which the container is formed.

Moisture-proofness is a relative term. And these new cartons can be given a full range of vapor-barrier characteristics by coating or laminating the board with various waxes, foils, polyethylenes, and other materials.

One such container (Lord Baltimore), now in active use for frozens, has been devised by cold-water coating a solid, 16-point sulfite board with a heavy polyethylene-wax layer. The flap-seals are formed with a special hot-melt glue that adheres to this coating.

Here, the web corners, combined with wax impregnation and full-glued flaps, undoubtedly give excellent product protection.



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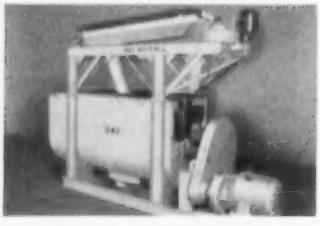

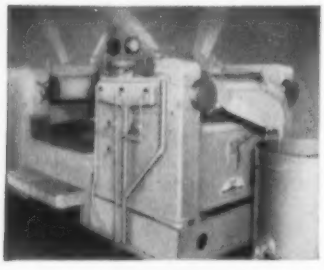

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But are these cartons economical? The answer to this question is not just a matter of balancing the savings derived from elimination of inner and outer wraps (and the accompanying machinery) against the higher cost of a hot-melt adhesive. Speed of the packaging operations must also be assessed.

Conventional installations are generally limited by the speed of overwrapping equipment (to a top limit of about 160 per min.) But for the sift-proof cereal pack, there is a new automatic filling and sealing machine (Neverstop, Stokes & Smith Co., Philadelphia) that hits an operating speed of over 350 cartons per min.

Economy With New Machines

To achieve this rapidity in a compact unit measuring only 26x4 ft. requires some rather unusual mechanical techniques:

- Carton flaps are preheated to prevent the high-temperature adhesive (300F.) from setting up too fast, and to increase glue penetration.
- Filling accuracy is pin-pointed by a unique combination of vibratory feed, check weighing, and electronic control. The free-flowing cereal moves from a supply hopper, down the vibrator trough, over a scale pan, and into constant-speed cups.

Product is distributed evenly to the latter, and variations in weight are picked up by the scale and relayed to the electronic controls, which intensify or slow down trough vibrations. On the cereal pack this system achieves a variation of only $\pm \frac{1}{2}$ oz.

- Reactivating heaters soften glue on the Van Buren ears after top and bottom flaps are sealed. They are then clamped in a refrigerated tunnel for a firm closure.
- Pressure-cooling conveyors and air jets, chilled by a 1½-ton unit, cut by two-thirds the distance needed for room-temperature or cold-glue compression units.

For the frozen food carton, a high-speed unit has been developed by R. A. Jones & Co., Inc., Cincinnati. Operating in much the same manner as the company's fish stick cartoner (FE Aug. '56, p. 66), this unit employs dual carton and product conveyors and a pusher arm to slip 5-in. pies into the containers at a 265-per-min. clip.

This company estimates that at current quotations, this packaging technique will save $1.50 per thousand cartons over similar carton-plus-overwrap operations (even after adding in $1.00 per thousand for the increased cost of glue).

For more data, circle this page number on card at back →

Fairbanks-Morse fire pumps provide 12,000 gpm. of water at 100 psi. for each of two systems.

World's largest jet aircraft center protected by F-M fire pumps

Four major aircraft companies—Lockheed, North American, Convair and Northrop—use the 5000-acre U. S. Air Force Plant No. 52 at Palmdale, Calif., for assembly and testing.

Maximum protection against fire at this gigantic operation was achieved at minimum cost by installing two identical, interlocking water supply systems, each equipped with Fairbanks-Morse pumps for both water supply and sprinkler pressure.

The size and scope of this installation indicate Fairbanks-Morse's ability to supply fire pumps for all magnitudes of industrial and municipal requirements. Whatever your needs in fire protection—big installations or small—your Fairbanks-Morse Field Engineer will be glad to work with your own engineers, in specifying the most efficient equipment. Call him today, or write Fairbanks, Morse & Co., Dept. FE-6, 600 So. Michigan Ave., Chicago 5, Ill.

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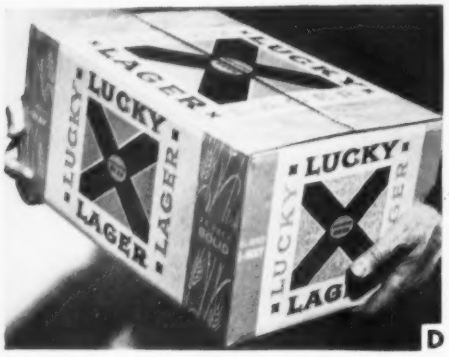
NEW PACKAGES & PRODUCTS



West Coast Brewer Revamps Package

Pictured are results of Lucky Lager's complete redesign of its beer package. Bottle (A) presents elegant appearance, appeals to women shoppers. Can (B) retains brewer's "X" trademark, offering instant identification. Bottle cap (C) repeats trademark while case (D) features bright border design of weaving barley. Designs are by Walter Landor & Assoc.

Circle 22A on Reader Service Card

Gourmet Spice Line Introduced in East

Albert Ehlers, Inc., New York City, is marketing a complete line of 72 gourmet spices packed in glass. Three trends sparked introduction of the line: improved consumer menus, increase in outdoor cooking, and popularity of gourmet spices now on the market.

Extensive package research resulted in a uniform glass jar with plastic shaker top. Vertical perforations in the colorful label show remaining contents. A large script letter helps identify contents (G for ginger, etc.).

Circle 22B on Reader Service Card

"Buy the bag . . . save the difference", says Duncan

PROTECTED BY RIEGEL

NEW DUNCAN COFFEE PACKAGE IS FORMED, FILLED AND SEALED ON A SHELL-PAKIT MACHINE AND USES RIEGEL LAMINATED, OPAQUE DIAFANE® SUPPLIED IN ROLLS.

Protecting the sales-winning qualities of fine products is only one of the many functions of Riegel papers. Saving money is important, too. Riegel does it for you by creating the right combination of the most efficient packaging materials . . . and by "tailor-making" the paper to run and seal at high speeds on your machines. Tell us what you want paper to do for you. Riegel Paper Corporation, P.O. Box 170, Grand Central Sta., New York 17, N. Y.

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GLASSINES AND GREASEPROOFS
Plain • Waxed • Printed
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Premium for Meat Packers

Designed to fit into 1-lb. packages of frankfurters is a flexible tube of mustard offered to meat packers by Best Foods, Inc.

To be used as a premium, the 5 in. polyethylene tube is sold to packers at cost.

Circle 24A on Reader Service Card

Pint Paper Container

Dixie Cup Co. is offering a tall 16-oz. container to dairy processors. The container was developed after research indicated a pressing demand among supermarkets for a 1 pt. paper container.

The supplier's standard 8 oz. closures of paper, plastic, or metal will fit the larger size.

Circle 24B on Reader Service Card

Instant Cream Puffs

Cream Puff Mix is the latest convenience food to be marketed under the Betty Crocker label. No sifting or pre-cooking is required. A pregelatinized starch removes the critical step in mixing.

One package will make 16 medium size puffs, or 20 eclairs.

Package Boosts Pizza Sales

A 400% sales increase has been reported by Sorrento Packing Corp. since it began packaging its precooked pizza in aluminum trays overwrapped with Cellothene.

The product is packaged immediately after cooking by creating a vacuum and adding nitrogen gas. This process reduced shrinkage and spoilage, and has extended shelf life to a minimum of four weeks.

Circle 24C on Reader Service Card

Two Award-Winning Food Packages are pictured above. At left is colorful winner of 7th Annual Lithographic Awards Competition. Blue Goose label featuring neat, modern design and quick identification, was by H. S. Crocker Co., San Francisco. (24D). At right is Top Frost ½ gal. ice cream container which took honors at American Institute of Graphic Arts' annual competition. Container Corp. of America designed the photographic label. (24E)

Circle key numbers on Reader Service Card

Vichyssoise in a Pouch

Two appetizing instant soups have been added to the Maison Julien line.

Instant vichyssoise is marketed in 2-oz. boil-laminated pouches for the retail trade, and 12-oz. jars for institutional use. One packet mixed with 3-4 cups of hot milk makes three servings of the tasty cream of potato soup, complete with a chopped chive garnish.

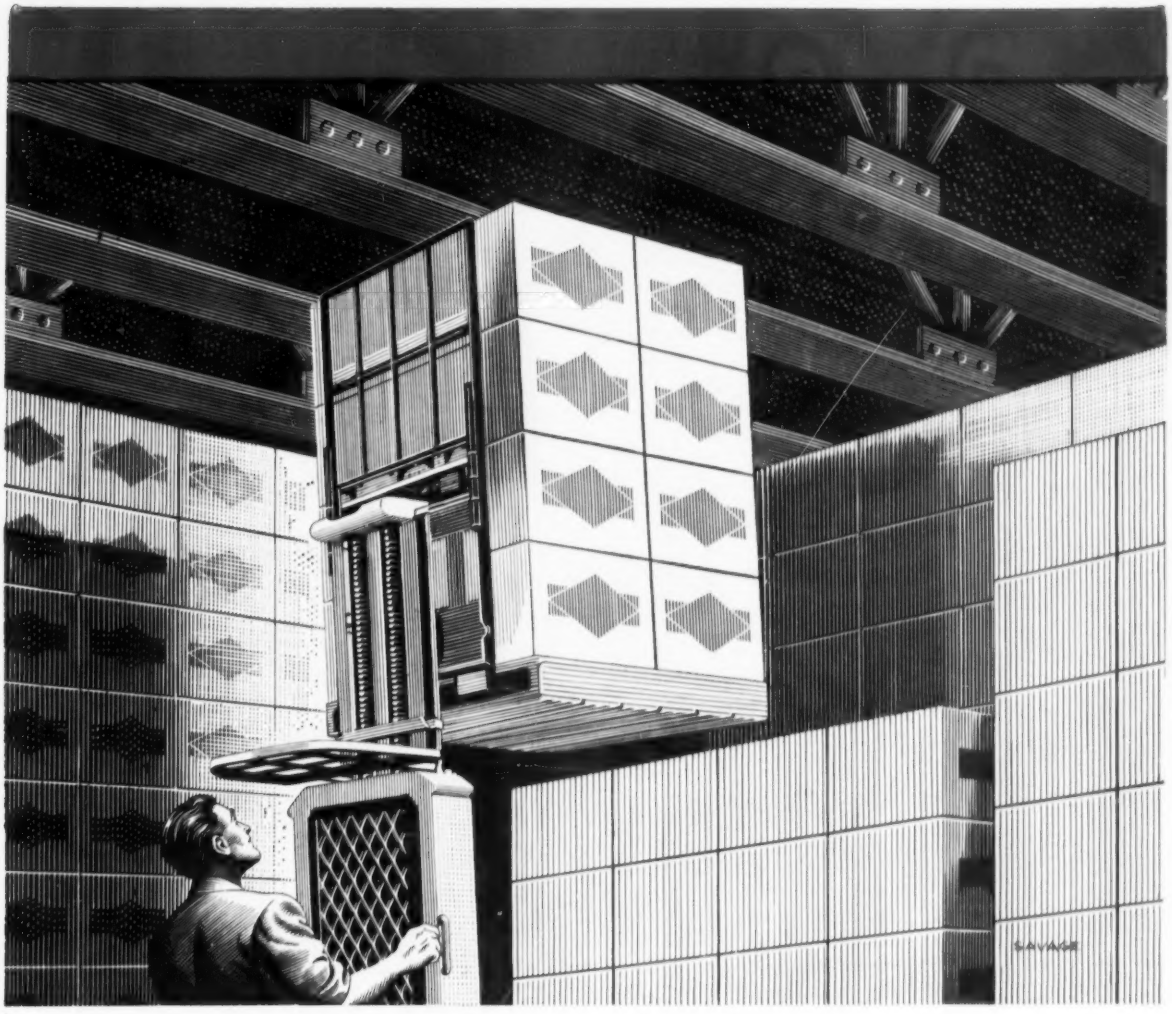
An instant shrimp bisque is packaged in 8-oz. jars for the institutional trade. Each jar makes 24 servings when added to 4½-qts. of milk. The mix may also be used to make a cocktail dip, or, by added water and gelatin, a colorful aspic.

The New York City processor is planning to add an instant hollandaise sauce to its line.

Pre-Peeled Potatoes

Pre-peeled and sliced fresh potatoes packaged in polyethylene are offering consumers in the New York area a new high in food convenience. Popularity of the product is reflected in a 90% re-purchase figure reported by the processor, United Pre-Pared Products Corp.

The potatoes are not frozen but



MAKE USE OF YOUR AIR-RIGHTS

Gaylord Boxes

Open space under your warehouse roof may be clear profit... if you can utilize it by stacking boxes taller. But, before you do, be sure your boxes will stand straight and strong under the increased load. Gaylord containers have this valuable "stack-ability" because they are precision built of the finest quality materials.

For information on containers to help you make full use of all your storage space, call your nearby Gaylord office.

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

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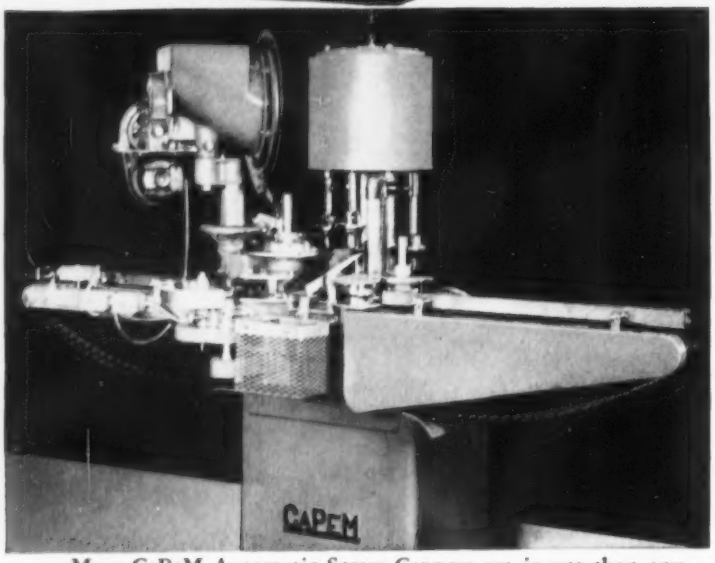
IF PACKAGING COSTS ARE
SKYROCKETING
CAPEM SCREW CAPPERS
WILL BRING THEM
DOWN



More CaPeM Automatic Screw Cappers are in use than any other make. And for very good reasons. They combine low initial cost, low operating cost and a minimum of maintenance expense.

MEET EVERY PACKAGING REQUIREMENT

Eight standard CaPeM models accommodate a broad range of standard sizes and shapes of both containers and caps, as well as a wide variety of flexible molded closures of the CT type, both in combination with polyethylene squeeze bottles and otherwise.

In addition, advanced types of CaPeM machines are adapted for sorting, feeding and applying Wheaton and similar type closures, Kimble-type polyethylene plugs, polyethylene fitments, corks, etc., and in combination with a wide variety of secondary closures.

CaPeM is fully automatic . . . delivers a uniformly dependable seal . . . handles bottles, cans, jars and jugs from 2 ozs. to gallons . . . applies all types of metal and plastic screw caps . . . is easily synchronized with all standard types of related equipment.

Write for specifications and the name of your nearest Consolidated representative. You'll find his broad experience with all types of packaging problems helpful.

CONSOLIDATED PACKAGING MACHINERY CORP.
1400 West Ave., Buffalo 13, N. Y.

are kept at a 35-40 deg. temperature. They have a three-week shelf life, brought about by a process developed at the University of Miami Food Research Laboratories, using a sulphur-dioxide compound.

Foil Bags for Bread

Brightly printed foil bags have been adopted by Bidou's French Bakery, San Jose, Calif., for their sweet and sour French bread. The foil package allows the consumer to heat the bread directly in the bag. Use of the bags is restricted to the summer season.

Packages were designed and printed by Milprint, Inc.

Circle 26A on Reader Service Card

Whole Rice Cereal

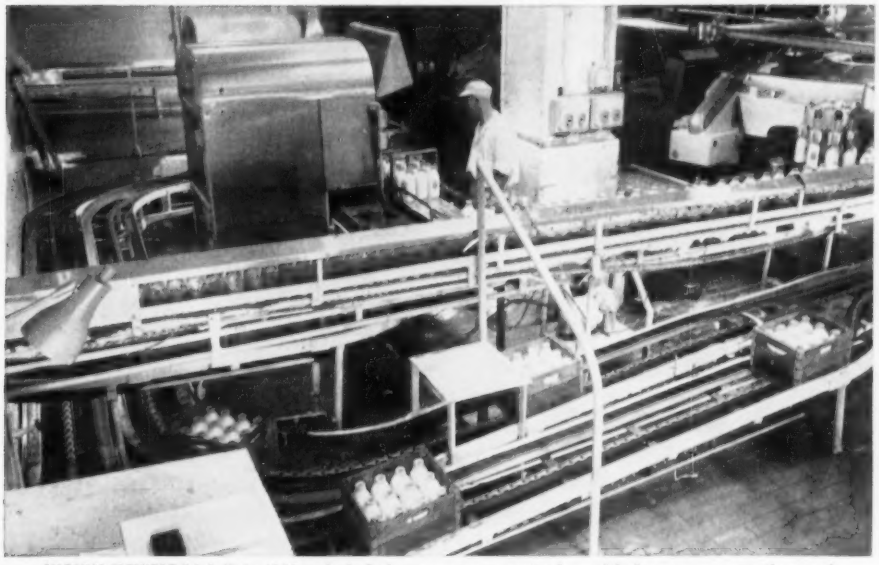
Reported as the first to retain the mineral element of whole brown rice is a new cereal developed by Battle Creek Food Co.

The product, a brown rice flake,

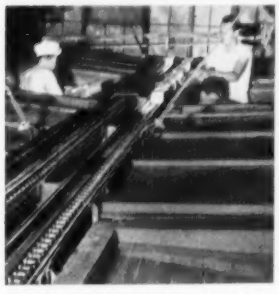
ACETATE OVERWRAPS are used by Produce Packers, Inc., Woburn, Mass. for its cartons of fresh mushrooms. Designed by the Dobeckmun Co., the wrap is Flexograph printed on top and sides. A transparent area on the top offers a clear view of the product.

Circle 26B on Reader Service Card

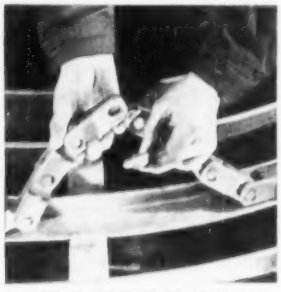
Link-Belt 4250 swivel chain conveys around curves—over vertical turns



HIGHLY FLEXIBLE Link-Belt 4250 swivel chain conveyor operates in multi-planes . . . saves time and effort while maintaining smooth flow of milk cases.



SMALL SPACE REQUIRED by 4250 chain conveyor gives this packing plant extra storage.



EASILY DETACHED OR COUPLED. Chain may be lifted out of track and taken apart by hand.

RENEWABLE "Flint-Rim" sprocket segments can be quickly attached to sprockets.

Broad top surface of links reduces wear on cases

Durable and extremely flexible, 4250 swivel chain is Link-Belt's answer to multi-plane conveying of cartons, cases, crates and similar containers in breweries, dairies and other bottling plants. Its swivel joint construction permits both horizontal and vertical travel—provides safe handling of containers around 15" radius horizontal turns. And single- or multiple-strand conveyors can be arranged to clear machines and other obstructions . . . or to facilitate receiving, processing, storage or shipping.

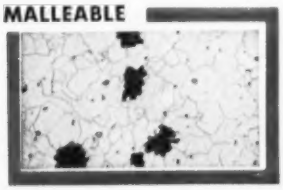
Wear Points Strengthened

Link-Belt 4250 swivel chain consists of links webbed across the top for greater strength and rigidity. Broad, flat carrying surfaces reduce wear on objects being conveyed. And smooth, flat vertical sides provide generous contact areas which minimize wear from track and guides on turns.

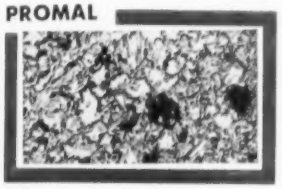
Designed to operate in standard 2-inch tracks, Link-Belt 4250 swivel chain is made with cast ball and socket type pins that simplify detachment or assembly—without tools. Although easily disassembled, it cannot disengage in normal operating position.

File-Hard Promal is standard for this chain, assuring long wear life.

MALLEABLE



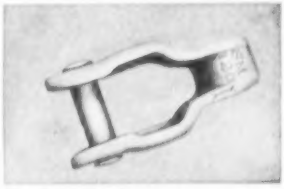
PROMAL



MICROPHOTOS show difference between ordinary malleable iron and Promal. Left—white areas in malleable microphoto represent "free iron" . . . black shows soft nodules of carbon. Right—dark areas in Promal structure show stronger, stiffer reinforcing material which strengthens metal; resists distortion, wear.

SM-120 chain is in wide use on brewery and dairy conveyors

Link-Belt SM-120 chain spells low-cost, straight-line conveying of cases, crates, etc., in various bottling operations. It's made of cast offset links connected consecutively with pins locked against rotation in sidebars. Closed joint construction keeps dirt out. Integral solid round barrels add strength.



SPECIFY "FILE-HARD" PROMAL FOR LONGER WEAR-LIFE

Link-Belt Promal chain with "file-hard" surfaces is the ideal answer for the extra strength and wear resistance demanded by heavy loads and long, sliding conveyors in bottling plant service. This special Link-Belt metal lasts much longer . . . costs but a little more. Both pins and integrally cast links of Link-Belt 4250 and SM-120 chains are furnished in File-Hard Promal.

HEADQUARTERS for chains, sprockets and other Link-Belt conveying and mechanical power transmission products is your nearby Link-Belt factory branch store or authorized stock-carrying distributor.

LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 15); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,302

NOW...

you can make

MOISTURE TESTS IN MINUTES

with the fully automatic

IR MOISTURE -MATIC BALANCE

Tests anything that can be oven-dried... just load... set time and heat... and let the instrument do the rest.

ALL the operator has to do is load the pan and set the timer and heat control to get quick, accurate, permanently recorded moisture readings of granular solids, pastes, liquids, waxes or anything else that can be dried by heat.

The portable IR Moisture-Matic, a product of Moore-Milford Corporation, utilizes *far* infrared for highest absorption and rapid, even heating, and has both a self-contained timer and variable heat control between 30 and 600 watts. The motor driven torsion balance automatically weighs the sample after the test, and the moisture percent is retained on a 3 digit counter to the nearest 0.1 percent. Operates on 115-volts, 60 cycles AC.

All components are of instrument quality to assure long life without maintenance expense. For guaranteed accuracy and speed in your moisture testing, ask your Scientific Products representative for a demonstration or write us today.

IR Moisture-Matic Balance complete, ready for use...

$325.00

S/P

Scientific Products—a single source for all laboratory supplies and equipment—offers a complete selection of moisture testers for every application.

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uses the entire rice kernel, including the bran and germ. Standard cereals use white or polished rice.

A leading health food processor for many years, Battle Creek Food Co. developed the cereal after 20 years of research. Addition of a sugar and saline solution remove the new product from the health food category.

Do-It-Yourself Cone Kit

A "midget-pack" of eight ice cream cups is now marketed by Safe-T Pacific Baking Co., San Francisco. Packed in a chipboard box overwrapped with cellophane, the cones may be used to make ice cream at home, or for hors d'oeuvres or cocktail dips.

The midget cones are about half the size of standard cones.

New Product Shorts

Flat-Top Paper Carton is now used by Home Juice Co., Chicago, to package Tahi Punch.

Chiffon Pie Filling is newest Jell-O product. Whipping for 4 min. with cold water and sugar is only preparation required.

Garlic and Butter flavored melba toast rounds are a new product of King Kone Corp.

Eleventh Flavor for Kool-Aid beverage powder is Golden Nectar.

Belgian Beer introduced at the U. S. World Trade Fair, New York City, carries Ekla label, and is made by Vandenheuvel Brewery, Brussels.

Cherry-Flavored chocolate chips have been introduced by Barg & Foster, Milwaukee. The chocolates were marketed earlier in butterscotch and lemon flavors.

Use

RHOZYME

Proteolytic Enzymes

to hydrolyze protein

RHOZYME purified food-grade enzymes serve as valuable aids in processing a wide variety of protein-containing material. If you want to make meats tender but not mushy, modify whey protein for cheese spreads, or prepare protein hydrolyzates, RHOZYME natural enzymes are efficient and economical. The food engineer will also find RHOZYME enzymes useful in processing a wide variety of proteinaceous wastes, either to convert them to useful products or to dispose of them economically.

Supplied as dry powders with excellent storage stability, RHOZYME enzymes are carefully standardized to give uniform, reliable performance.

If you want to improve the processing of protein we will be glad to show you how the *specific* and *controlled* action of RHOZYME enzymes can help. Write Dept. SP for full information.

RHOZYME is a trade-mark, Reg. U.S. Pat. Off. and in principal foreign countries.

Chemicals for Industry

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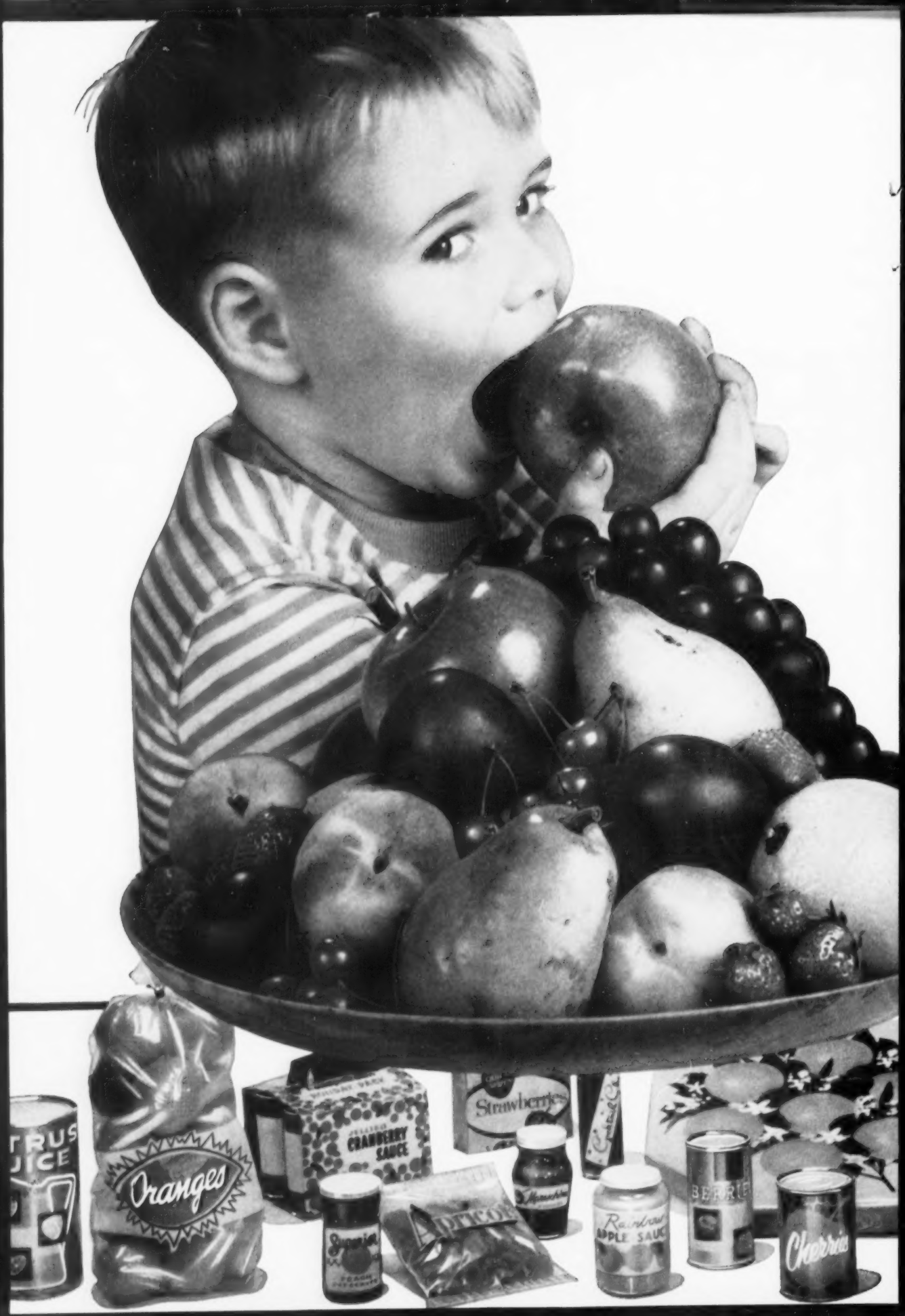

Oranges
CRANBERRY SAUCE
Strawberries
Rainbow
APPLE SAUCE
Cherries

Whether your fruit product is large as a grapefruit or small as a currant . . . is grown locally or in the tropics . . . is frozen, fresh or dried . . . sliced, crushed or diced . . . squeezed into a juice or mashed into a sauce . . . processed into a concentrate, syrup or extract . . . or is still in its original whole . . .

Continental has the right package for you!

Each Continental division is a leader in its field. Each has its own unexcelled facilities for manufacturing, research, development and sales. Now, each is backed up by a breadth of experience unmatched in the packaging industry.

CONTINENTAL CAN COMPANY

SERVING INDUSTRY...SERVING AMERICA

TAILOR-MADE PACKAGE SERVICE

CANS • VAPOR-VACUUM® CLOSURES • FLEXIBLE PACKAGING • FIBRE DRUMS • SHIPPING CONTAINERS • STEEL CONTAINERS • PAPER CONTAINERS • PLASTIC CONTAINERS • FOLDING CARTONS • DECOWARE® • CROWNS AND CORK • BONDWARE® • GLASSWARE • BAGS • CONOLITE® • GLASS CONTAINERS • PAPERBOARD

(This advertisement originally appeared in full-color in TIME, BUSINESS WEEK and FORTUNE.)

DARE TO COMPARE!

of Operating Pressure on Homogenizing Efficiency using Dyna-Jet

Mr. John Hassell, Assistant Dairy Sales Manager, points to Dyna-Jet's increased efficiency at all pressures; and asks you to . . .

DARE TO COMPARE all the Gaulin Features

Heavy duty construction

Slowest average operating speed — proven longest life

Positive pressure lubrication

Long life nylon cylinder gaskets

Automatically adjusted plunger packing

Exclusive ball valve cylinder for abrasive products

and the revolutionary Dyna-Jet

DYNA-JET homogenizes better AT ALL PRESSURES

When you look at a homogenizer, look at the two factors most vital to your own operation — quality of end product and operating costs.

Gaulin Spectrophotometer charts show exactly what happens:

As pressures increase the degree of fat particle break-up becomes finer and finer . . . permitting more light to be transmitted through the test sample. At any given pressure, Dyna-Jet does a better, more efficient job than any other valve.

Result: A new fineness and uniformity in the homogenizing of milk. *Plus*, new opportunities to control operating costs by proper application of pressures, power consumption and efficiencies.

Truly, there's a new science to homogenizing. Dare to compare *all* the facts on homogenizing valves — ask to see and hear the remarkable story on the new Gaulin Dyna-Jet Valve and Light Transmission readings. Contact your local Manton-Gaulin dealer, or write: The Manton-Gaulin Manufacturing Co., Inc., 73 Garden St., Everett 49, Massachusetts.

MANTON Gaulin MANUFACTURING CO., INC. EVERETT, MASS.

MG 7-17

Ole Sage Episode

"Ole went on with his confession: "Yes, I even boldly suggested just how he could do it."

Will the Barring of Oldsters Cause a Crisis?

IVAN C. MILLER
"Food Engineering"

"WE HAVE HAD A BETTER world because of such men as Churchill and Einstein continuing to work for many years beyond 'normal' retirement age. —That's what Ole Sage was saying when we broke up the last meeting."

It was Personnel Manager Milt Sorenson speaking, as the Guff & Gripers rounded off their dessert.

He went on: "At our plant, where retirement is compulsory at 65, one of the No. 1 men is our company doctor. He's been our part-time physician for many years, and though he's now about 70, he's still alert and dependable."

"Which brings up the fact," interposed Barney Hasbrook, "that *doctors generally don't retire.*"

"That's true," exclaimed Si Worth, personnel manager of Zenith Canning Co. "Just recently I read that something like eight out of every ten doctors keep on practicing after passing industry's arbitrary retirement age of 65. This report states that many of these veteran practioners are doing a remarkable job—some of them caring for the health of entire communities for which they alone are medically responsible. Medically short-handed as we are, where would this nation be if we were without them?"

"That's right on the beam," lauded Ole. "And haven't all of you noticed the confidence and security that the presence of older doctors lends to a hospital staff or community?

"In the same way, older workers bolster a group's morale and stimulate productivity. The old timers know company history and practice and usually are very loyal. They're a source of confidence and inspire others.

"Through the years," went on Ole, industry's been changing at an accelerated pace. During his life time, today's veteran worker has experienced many transformations and has learned to adjust—to roll with the punches. Also, he helps cushion the newcomers in their difficult readjustments to the constant shifts. Many times, mature judgment of the oldsters guides the others in the group, thus speeding them along the main line, well clear of the side tracks."

Batt Bulwark, Mull & Mull's works manager, chuckled. "I've a hunch, Ole, about what you're trying to put across. You mean that when there's a fair portion of old buzzards in the work force they tend to keep down strikes and promote labor peace. Isn't that it?"

"It's true that fewer strikes are likely and labor peace more certain when the working force is influenced by older employees. However, the elder ones primarily promote better day-to-day worker satisfaction and higher productivity."

Ole's countenance now mirrored chagrin. He continued: "I recall a time, some 15 years ago, when I sure was 'taken apart' for some free advice I offered regarding a bunch of oldsters—advice I soon found was less than worthless.

"It happened when I was on vacation in another part of the country. I'd run into an industry friend, and he'd taken me through the quite-large food plant where he was in charge of engineering.

Though in some respects this plant's operations were highly modern, in others they were not. To me, the proportion of hand labor they used appeared wholly unjustified, particularly in what seemed an excessive amount of operations by women workers, a large number of whom were quite elderly.

"So I asked my friend if it wasn't possible for his outfit to improve techniques and thus cut labor costs considerably by reducing the large number of older women. I even boldly suggested just how he could do it.

"It was then that I learned my sobering lesson about handing out free advice when it hasn't been asked for."

Grinning a bit guiltily, Ole eyed the younger men around the table.

"A new class war between the young and the old will manifest itself"

"I was younger then, and hadn't thought much about my own forced retirement, which at that time seemed far, far away.

"My friend had listened to me patiently. 'Well,' he finally said, 'your suggestions are quite sound—from the pure standpoint of engineering a system for saving labor. Some years ago, as a matter of fact, my department calculated the savings in labor and vital plant space possible through such a program. And the changes looked justified beyond any reasonable doubt.

"'Only—our particular company was afraid to make a move. And here's why:

"'Operating over a wide territory, we'd always maintained an acceptable share-of-the-market balance with our largest area competitor. We watched as this company revised its working setup. In the course of its changes, it forced out its group of older women workers—a group similar to the one we'd have been compelled to dismiss if we made those same alterations.

"'Sure, for a time they undersold us, and we lost customers alarmingly. In truth, this sped us to the verge of following suit. But then the aggressive younger group in their labor force, which had gained control of the union over there, made some highly unrealistic demands—likely in retaliation to the cut in the labor force. Result was that the company took a strike in preference to making the concessions.

"'In time, of course, the strike was settled. But our own company, and a few others in the same competitive field, had by that time taken over the struck plant's market. And they have never regained it.

"'You see, for many years all our people have been unionized, and that group of women—many of them, as you noted, quite old—run the union. They feel secure in their jobs, which they like. And they oppose any rocking of the boat. They are the balance of power in the union.'"

Batt smirked. "I'll bet they were paying those old gals substandard wages," he belittled.

"You lose, Batt," chuckled Ole. "To console you, I admit that I had the very same hunch. But it was off base. All the company's wages—and salaries too, for that matter—have always been maintained equal to, or better than, those of other plants in the same field in that area."

At this point, Barney Hasbrook opened up: "It seems to me," he complained, "that we've started going in a circle. So, can I take a potshot here at adding it all up?"

Getting nods of encouragement, Barney offered his summary: "Many older employees have proved themselves a definite work-force asset, some even after passing normal retirement age. But whether due to our present pension system, to prejudice, or for other reasons, the trend is to reduce the proportion of employees past 40, while meantime the number and proportion of economically dependent youngsters increases rapidly as the age for starting to work is consistently pushed ahead.

"All of which means, it seems to me, that in the future each member of the work force must contribute more and more to the support of the rest."

"That's what I call a squeeze play," proclaimed Batt, "And it's a situation where those squeezed don't know where the squeeze comes from, even though they help to make it."

"It is becoming very serious," emphasized Ole. He then pulled out his notebook, "Here's one of the angles that Secretary of Labor James B. Mitchell figures must be reckoned with, and I quote: "'If economic life becomes too hard for older people, they will form the most potent group this nation has known and will force some kind of public program for their survival. This is a possibility which industry must face immediately. Will it find places for older workers and make profits from their production—or be taxed much more heavily than now in order to sustain them as non-workers?'

"Nor is Secretary Mitchell alone in that viewpoint," explained Ole as he drew a clipping from his notebook. This is what Frank G. Dickinson, well known economist of the American Medical Assn., had to say on the subject at the recent Southern Conference on Gerontology:

"'A new class war between the young and the old will manifest itself in several ways. First, there will be a heavy pension tax that may eventually absorb more than one-quarter of the income of both workers and the employers. This new class war may progress so far that we will see workers and employers—in spite of their natural respect for age—standing shoulder to shoulder against the hard-driven politicians who promise our senior citizens impossible pensions and who will encourage the older workers to exploit the younger workers, the older business men to exploit the younger business men.

"'Let's remember that these pension leaders will soon command the vote. Karl Marx and others have taught us that mass movements are rarely rational. They spring from broad social changes.

"'Let us remember, first, that these basic changes in the population pattern started recently and slowly. The resulting mass movement has not yet matured. Townsendism may be as important in the next 50 years as were the doctrines of Marx during the last 50.

"'Second, the common bond between the employer and the worker will grow stronger. As it does, the influence of the labor leader will diminish and the old Marxian class struggle will gradually disappear.

"'Third, pensioners, even retired union men, will naturally be opposed to higher wages because this retired group obviously cannot profit from wage increases. If you doubt this, talk to pensioned union men. Or take a straw vote of the anti-labor sentiment of citizens retired from all walks of life. You will discover their attitude will be anti to every measure that tends to raise prices and reduce their buying power.

"'Four, I ask what is to be the fate of my generation, when we retire, and when into our infirm hands will be entrusted the sceptor of power, for we will have the votes. The tremendous increased life expectancy is now contributing a major social and cultural revolution—the greatest since the fall of Rome.

"'I believe that this very revolution is the basis for the cradle-to-the-grave sentiment. May I put the proposition quite bluntly: Cradle-to-the-grave, it seems to me now, is a scheme whereby those close to the grave will fasten themselves onto the paychecks of those closer to the cradle, and ride piggyback—or piggybank—to the grave.'"

"Wow!" blurted Batt. "I sure want to know the way out of this situation, whatever the alternatives."

"Yes, we all want to know," said Milt. "But the clock's against us. We'll have to pick it up again next time."

His enthusiasm puts you in the driver's seat

We've learned one thing about drivers in the process of building over 250,000 lift trucks. An *enthusiastic* driver can make a good truck *look* good. How do you get an enthusiastic driver? By giving him the new *Clarklift*, a truck he's *sure* to like. It's a combination that you know will result in superior truck performance.

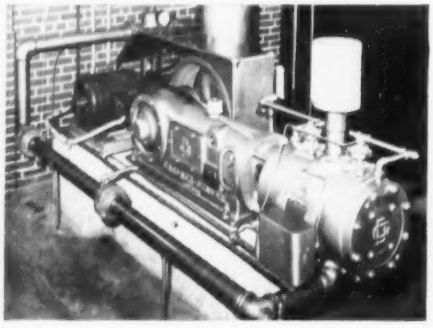
We're sure the new *Clarklift* is the best performing truck on the market today. We're equally sure of driver enthusiasm. Thousands of design and test hours stand behind this assurance to you. So when you match his enthusiasm with the finest performance in industrial trucks, it's pretty obvious—you're in the driver's seat too.

Industrial Truck Division
Clark Equipment Company
Battle Creek, Michigan

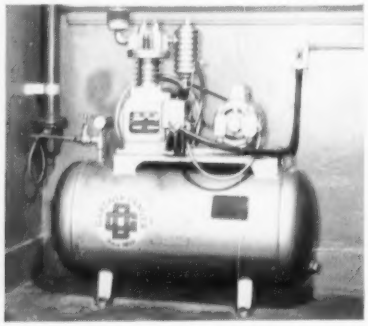
CLARK® EQUIPMENT

OIL... fine in its place but not in your product!

End your search for an oil-free air supply. These Gardner-Denver compressors deliver it in abundance, without special filters. Self-lubricating carbon in piston, piston rings and other parts eliminates the need for oil in the air cylinder. Air is delivered clean—free from oil vapor and other foreign matter.



Gardner-Denver CRX carbon piston compressor. Delivers low-cost, oil-free air around the clock. There is no need for two separate air systems; the CRX meets air demands with minimum maintenance. Sizes from 89 to 1292 c.f.m.



New Gardner-Denver CACB tank-mounted outfit. A small, space-saving, oil-free air producer. Supplies 4 to 5 cubic feet of air per minute. Suitable for discharge pressures of 40 to 100 p.s.i.

Send for bulletins.

ENGINEERING FORESIGHT—PROVED ON THE JOB
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Gardner-Denver Company, Quincy, Illinois
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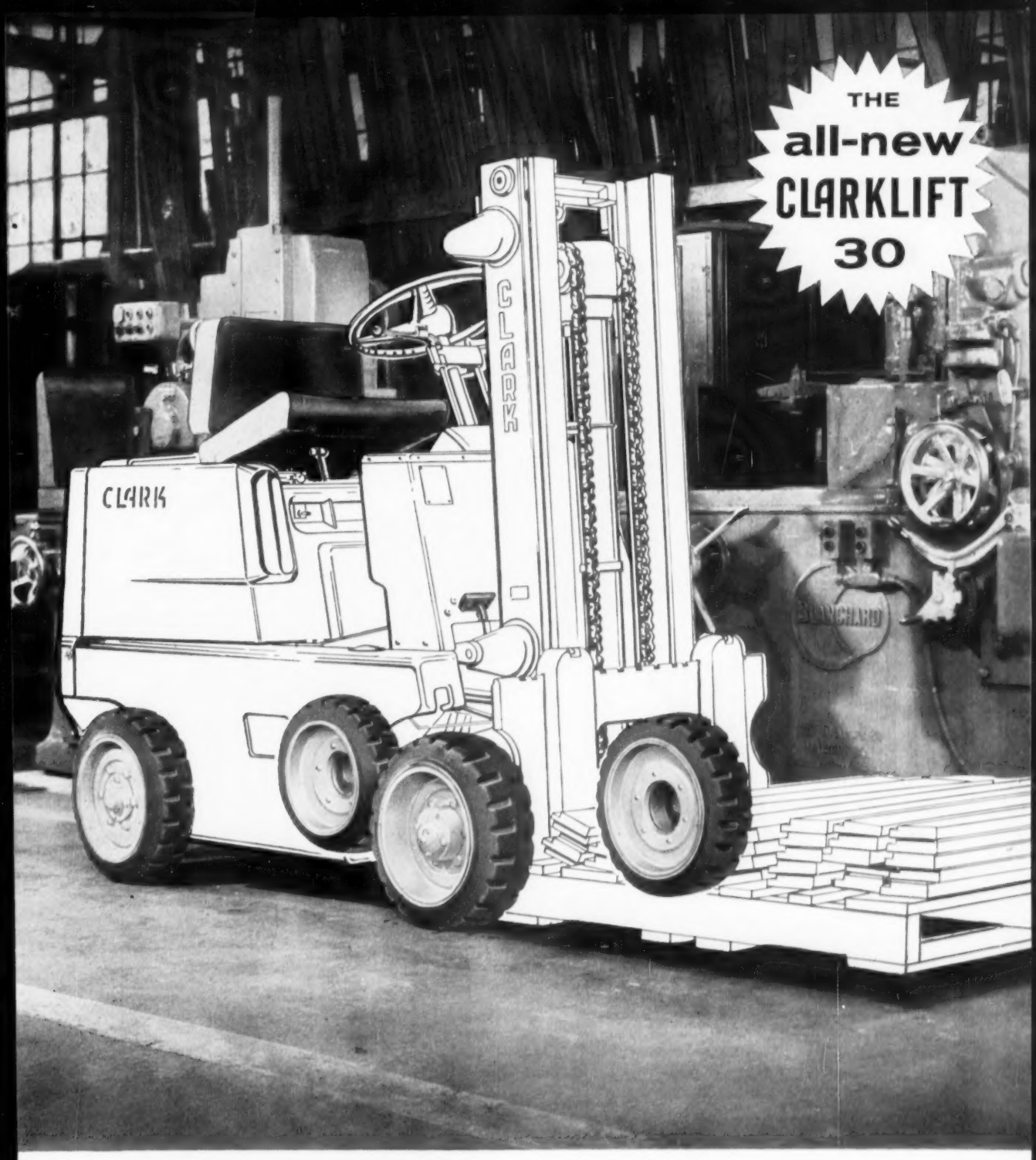


A twin-tired truck prevents one tired driver

Take a look at this new *Clarklift*. Notice the back and front wheels are the same diameter! Your drivers can tell you this permits a much smoother ride for them *and* the load. These big rear wheels won't drop into every little depression in the floor as small wheels do.

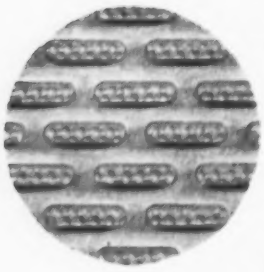
On the new *Clarklift*, equal-sized wheels not only smooth out bumps, but take the groan out of steering. One lever on the steering column controls all lift and tilt action. There's a wide easy-moving brake pedal. No clutch. And when the driver settles down into that roomy, adjustable foam rubber seat, he won't want to leave it. It's no secret . . . *he* will like the *Clarklift* and *you'll* get more work from it.

Industrial Truck Division
Clark Equipment Company
Battle Creek 14, Michigan

CLARK® EQUIPMENT

US RUBBER **STEEPGRADE**

Visit our exhibit booth #515, National Materials Handling Exposition, Philadelphia, Apr. 29—May 3.

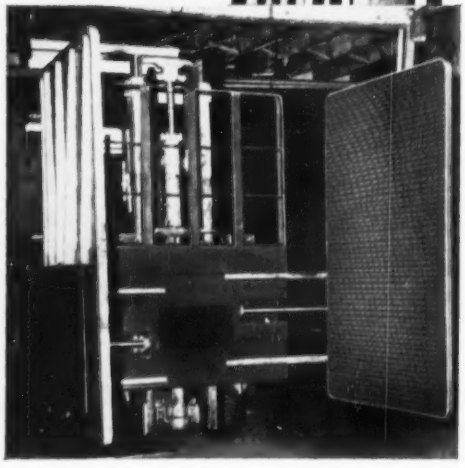


BIG LIFT GETS A BETTER GRIP

This giant clamp, a hydraulically-operated attachment for lift trucks, can handle almost any kind of load in bales, boxes, bags, cartons or crates. Recently, the makers of the clamp lined its arms with U. S. SteepGrade. Its rugged traction and non-slip grip (even at a capacity of up to 5000 pounds) has proved so superior to previous lining that the clamp manufacturer has now standardized on U. S. SteepGrade!

Of course, SteepGrade's principal job in industry is as a conveyor belt, carrying materials on ascents or descents as steep as 45 degrees. The exclusive "gripper-cleat" construction (see life-sized section above) holds packages and other articles firmly, prevents "avalanches" at critical angles. SteepGrade's ability to work at steep angles saves valuable floor space, conveyor length and belt footage.

U. S. SteepGrade—plus expert engineering service—is available at any of the 28 District Sales Offices, at selected distributors, or contact us at Rockefeller Center, New York 20, N. Y. In Canada, Dominion Rubber Co. Ltd.

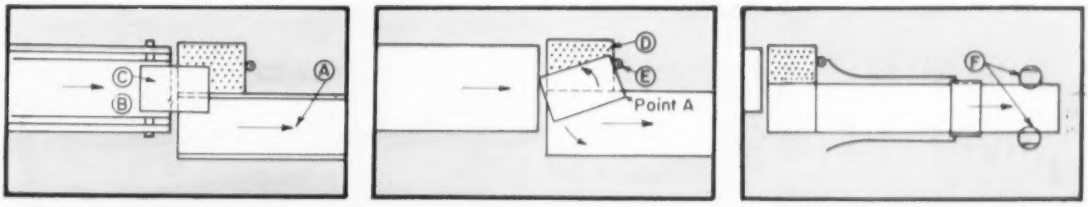


US RUBBER **Mechanical Goods Division**

United States Rubber

TEAR OUT AND FILE

PRACTICAL IDEAS



HOW CARTON TURNER WORKS. As rough-top belt (A) pulls it from compression belt (B), carton (C) is partly supported by ball-bearing table (D). As carton starts swing to left ball-bearing race (E) stops forward movement. Carton slides back on bearings, pull of conveyor completes 90-deg. turn, and guard rails center it between printing units (F).

Turns Cartons 90-deg. for Printing

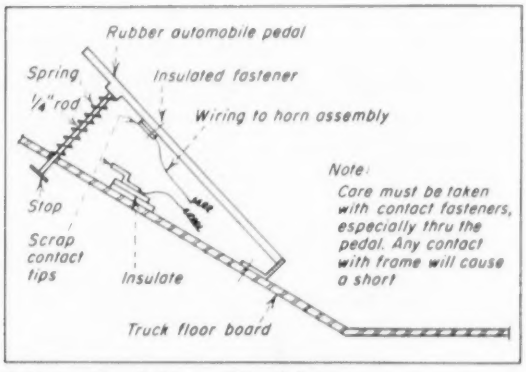
Here's how to set a rig for turning a carton 90 deg.—while traveling on a conveyor—to facilitate code marking, printing, or partial printing while in the regular production line.

After cartons leave the glue machine, and go through the compression unit, they move so that they are partly on a table and partly on a rough-top conveyor belt (see sketches). The rough-top unit is about ½-in. higher than the bottom belt on the compression unit, thus creating pull on one side. Also, travel of rough-top is more rapid, giving cartons time to make a complete swing before next one comes.

The table is double-equipped with ball-bearings. Besides being surfaced with the anti-friction units, it has a ball bearing mounted on it so that the race is adjustable in and out, as well as up and down, to conform to the needs of any particular carton.

Placing of the rough-top conveyor, in relation to the carton coming off the compression unit, is important, and has to be experimented with for each type or size of carton. Proper adjustment is also necessary to prevent point "A" (center sketch) from getting caught behind the ball bearing race. If it does it will continue turning beyond the 90 deg.

When race is placed right it will allow the carton to turn on the free-rolling table-top bearings and slide onto the conveyor belt as it makes the turn. Then standard guide rails finish the job of centering and aligning the case for its entrance to printer units on either side of the belt.—*W. F. Attinger, Plant Manager, Continental Nut Co., Chico, Calif.*



Solves Truck-Horn Trouble

We had considerable trouble maintaining workable horns on our electric fork trucks. After trucks had run for a short time between a −10F. area and one at +100F., condensation in the horn buttons disturbed the hookups.

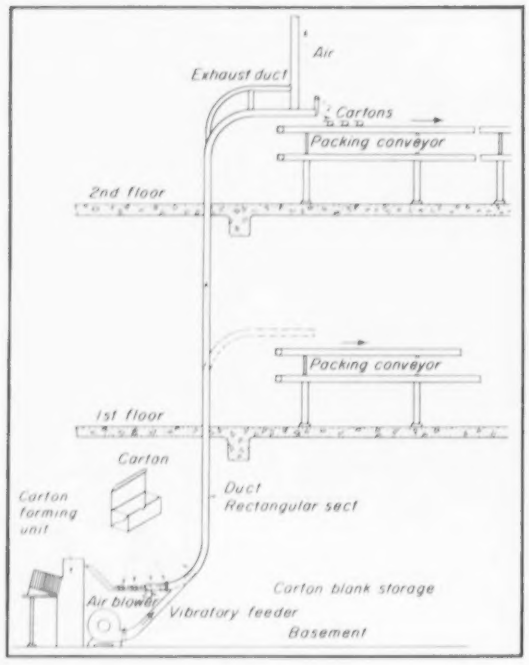
Another reason for seeking a remedy was that our warehousemen wear heavy gloves and are pretty busy with their hands. In short, we wanted something simpler than the button for sounding the horns.

Answer was found by using old fork-truck contact points (see sketch) as horn switches. Any cold storage plant or refrigerated warehouse should have lots of them. Our pedal for operating the switch costs but 40¢. The rest of the material is just scrap.

However, here's one caution: The spring which keeps the electric contacts apart should be stiff enough to support the driver's foot while at rest.

Since our trucks don't require use of the operator's left foot, the horn pedal is placed conveniently on the left side. The construction is very simple, but it is stout enough to withstand the abuse of a heavy boot.

Care must also be taken that no contact is made between the points and the frame, for this might cause a short. When trying this system, first check the horn wiring of your truck and then hook up the pedal switch accordingly.—*Stuart D. Smith, Assistant Manager, Sanger Ice & Cold Storage Co., Sanger, Calif.*



Air Elevates Preformed Cartons

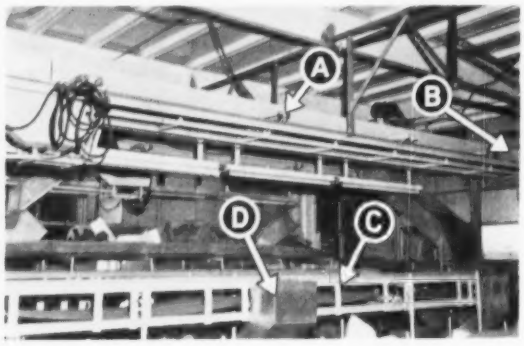
Our present system of elevating cartons through an air blower duct has proved to be a sure way of getting them to the first or second floor from our basement forming department.

Cartons move along a vibratory feeder from forming machine to duct entrance where they are picked up by the air stream. After passing the air exhaust duct the cartons slow down, push through a hinged gate and drop onto the packing conveyor.—*K. Ishige, Confectionary Engineer, Osaka, Jajan*

Painting Aids Sanitation

White painting of corners to help keep them dirt free is now practiced in many food plants.

We go a step further. In short, we paint the corners of each step on a staircase. And to speed doing the job, we use stencils. Employees are now more conscious of corners and try to keep them clean. When dirt does accumulate at these points, it is more readily noticed against the white, and more easily cleaned.—*Chas. O'Brien, Sanitation Superintendent, Kedzie Bakery, National Biscuit Co., Chicago.*



Trim Line Fed By Track-Mounted Belt

Inspection and trimming of vegetables while traveling on a belt often presents the problem of providing equal amounts of work for all the girls on the line.

To get even distribution of broccoli along a conveyor we have installed a movable delivery system that deposits stalks all along the belt within arm's reach of the girls, thus providing each a constant supply of work.

The overhead unit consists of a belt, pulleys, and drive, all supported on rollers (A in photo) that run on an angle-iron track. The track is suspended from the ceiling and extends through an opening (B) in a wall to a loading platform outside of the building.

Another belt, located on the loading platform, carries produce up and onto the movable belt. Then, while the traveling belt is moving the load toward the inside pulley, the belt, pulleys, and drive are all pulled along the track by a steel cable. This causes product to drop from the discharge chute along the whole length of the inspection belt (C).

Girls pick vegetables from the belt, cut off ends—which drop through a chute (D) and are removed via a lower conveyor—and replace trimmed pieces for movement to processing.—*H. W. Tilghman, Plant Manager, Shoreland Freezers, Inc., Salisbury, Md.*

CAN YOU USE $50?

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Send one of your ideas to FOOD ENGINEERING.

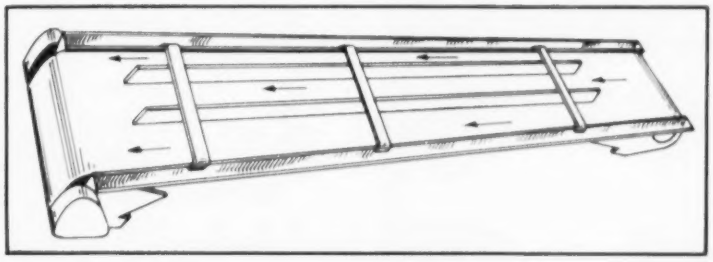
Each month $50 is presented to someone like you for the best item in this department. And the chance that it will be you is now running about one in ten.

Also $5 to $15 (sometimes even more) is paid for each contributed item used. So a few minutes time may net you as high as $65.

Just send us the facts about your idea and its application. And include a free-hand sketch or snapshot to illustrate it.

We'll do the finished writing and drawing for you. Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors.

MARCH PRACTICAL IDEA WINNER was "Stops Side-Drift of Belt," sent in by John H. Nicholson, Project Engineer, The Exchange Orange Products Co., Ontario, Calif. (Winners are chosen by Readex, a foremost outside survey agency that regularly polls many scores of FE readers throughout the country.)



Multi-Lane Sorter For Fruits and Vegetables

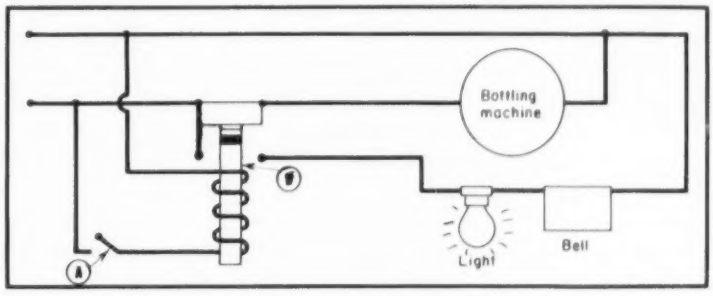
Dividing a conveyor into several lanes makes sorting fruits and vegetables easier.

An efficient divider (see sketch) can be made from 1- or 2-in. steel strap or sheet metal. It simply fits on the troughs edging the belt without at all changing the belt itself. The number of lanes can be varied to suit particular operations.

Advantages cited for this attachment are reduction in labor requirements (claimed to be as high as 50%), and accomplishment of a higher degree of quality control.

Increased efficiency results from using the divider because it: (1) concentrates attention of the sorter on a smaller area, (2) permits belt to run at a higher speed, preventing stratification and pile-ups, (3) does away with overlap, of one sorter with another, on production line, (4) requires fewer operators (only one per lane) at each sorting table. However, more helpers may be needed to sort poor quality products.

The 3-lane divider is particularly helpful in sorting small fruits and vegetables—peas, beans and berries. For larger produce, such as asparagus, a 2-lane unit is more satisfactory.—*"Agricultural Marketing," USDA, Washington, D. C.*



Alarm Buzzes, Lights Up When Bottle-Filler Stops

Getting the operator and a mechanic to our bottle-fillers as soon as stoppages occur was easy after we installed an alarm system.

Two metering pumps deliver water and syrup in a 7 to 1 ratio to the bottling machine. But if no water or no syrup is passing through the metering pumps, the bottler stops automatically.

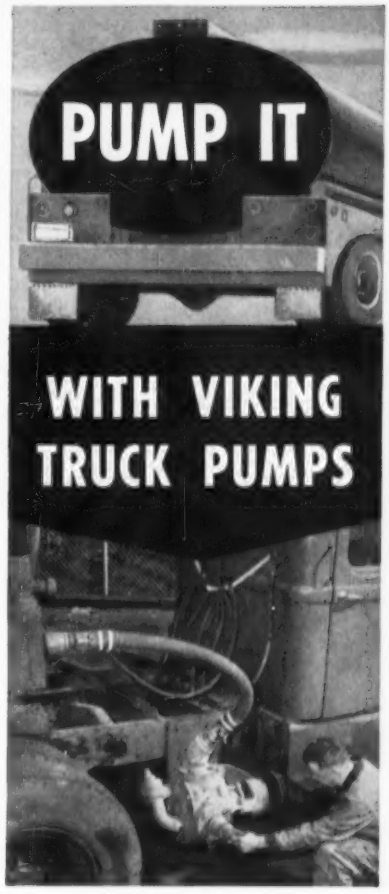
The stoppage is controlled by a solenoid switch (A in sketch) that is actuated by the liquid pressure in the metering pumps. As long as there is liquid in the pumps the bottling machine circuit remains closed. When the flow stops solenoid (B) opens the circuit.

We put a light and bell outside the bottling room, hooked up so that when the solenoid opened the bottling machine circuit it closed the light and bell circuit.—*F. Rockei, Plant Engineer, Kirsch Beverage Co., Brooklyn, N. Y.*

Stops Empty Conveyors

Here is an easy way to stop conveyors when bottles, cans, or cartons fail to arrive at a location or station.

Mount a Microswitch No. 51ML1 at an angle-iron bracket adjacent to the conveyor. Then replace the



...and SAVE valuable loading and unloading time

If you are transporting a liquid or semi-solid, you will save valuable time and money when you load and unload with a POSITIVE Viking truck pump.

Powered from the truck, through power take-off from the transmission, the Viking positive pump keeps the truckload on the move —not standing idle with slow gravity filling and emptying.

Equipped with integral Viking relief valve, the discharge line may be shut off without stopping pump.

Available in 35, 50, 90, 200 and 300 GPM sizes. Ask today for Catalog Ge and SP377e.

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See our Catalog in Sweet's Plant Engineers File

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NEW

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ADJUSTABLE HOPPER

Hydraulic Frozen Meat Cutter

THREE GREAT OPERATING FEATURES!

Faster . . . Powerful . . . Positive Cutting.

Slices frozen blocks of meat directly from the freezer. Ideal for plants handling blocks of varied sizes. New adjustable hopper quickly accommodates itself to wide range of block sizes by simple turn of wheel.

THREE GREAT SAFETY FEATURES!

Gravity Feed . . . Horizontal Knife Action . . . Power Safety Release.

Operator safety is paramount feature of this unit. Top loading adjustable hopper employs gravity feed, and, the location of cutting knife provides an additional positive safety feature. Power automatically cuts off when hopper is tilted out of place for cleaning or adjustment.

THREE GREAT SAVINGS FEATURES!

Eliminates pre-thawing . . . sawdust waste . . . retains juices.

Produces clean, sawdust free slices in varying thicknesses. Since no pre-thawing is necessary, juice losses are also eliminated and the danger of meat discoloration, bacteria or other contamination avoided.

THREE GREAT SANITARY FEATURES!

Design . . . Material . . . Cleaning.

B.A.I. recommendations have been followed throughout in design and choice of materials. Hydraulic unit and all electrical equipment is completely protected and enclosed so that hot water or steam can be used for cleaning without damage.

INTERNATIONALLY KNOWN · UNIVERSALLY ACCEPTED

AVAILABLE FOR SPECIAL APPLICATIONS

Special modifications of this unit can be engineered to your requirements. Stroke operation likewise can be timed and synchronized for completely automated processing.
Write today for more complete details and specifications.

H. G. WEBER & COMPANY, INC.

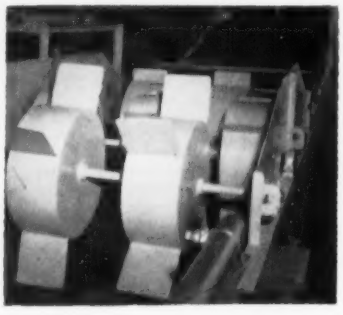
KIEL, WISCONSIN

Practical Ideas

switch roller with a trigger arm riveted to the standard arm and bent to an angle over the conveyor.

Now, when containers are on the conveyor and moving past the station, they will swing this actuating arm to close the switch, thus keeping the drive motor operating the conveyor. But when there are no containers to contact the arm, the switch is opened and the conveyor stops.

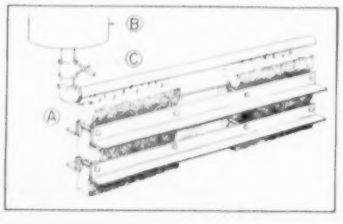
Special advantage of this arrangement is that this control can be safely operated in wet locations.—*John Ehinger, Design Supervisor, Creamery Package Mfg. Co., Ft. Atkinson, Wis.*



Keep Vegetables On Move

These paddle wheels (see photo) keep asparagus moving through our cooling tank.

Vanes are welded to drums that rotate on V-belt driven axles. Located near the discharge end of the tank, the wheels nudge asparagus stalks onto a woven wire belt (Cambridge Wire Cloth Co.) that moves them to a desander unit.—*H. W. Tilghman, Plant Manager, Shoreland Freezers, Inc., Salisbury, Md.*



Rolls Sponged With Egg

Double benefits have been realized by this device for egg-washing rolls. Not only does it conserve labor, but it also eliminates the possibility of

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FULTON SYLPHON TEMPERATURE REGULATOR HEADQUARTERS, U.S.A.

CONTROLS TEMPERATURE

UNDER ITS OWN POWER

COMPLETE LINE OF REGULATORS, VALVES, MIXERS, AND CONTROLS FOR LIQUIDS, AIR OR GASES.

Whether it's designed in process equipment or added later, the Fulton Sylphon No. 999-T Temperature Regulator provides the accuracy and simplicity that mean lower first costs—lower maintenance costs—and lower processing costs. It's completely self-contained, uses absolutely no outside power to detect temperature or to control it. And with its famous Sylphon bellows, it has the power and sensitivity for highly responsive control action.

"Over-run" feature protects regulator against damage if temperature at the bulb accidentally exceeds regulator range.

Available with or without an easy-to-read thermometer that accurately shows temperature at the bulb.

Extra large two-ply seamless Sylphon bellows assures long life—provides extra power for positive control action.

Regulator is available with bulb shown for control of liquids or with other types for air, gases, etc. Made of copper, steel, stainless steel, lead, plastic coated, etc.

Added strength of stainless steel frame resists accidental blows—keeps bellows and stem aligned.

Ball-bearing wheel turns easily to change control point settings. A clearly marked scale shows adjustments at a glance.

NO. 999-T TEMPERATURE REGULATOR

Available with 60° F ranges between 20° and 455° F.
Variety of valve types in sizes from ¼" to 4".

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Robertshaw-Fulton CONTROLS COMPANY

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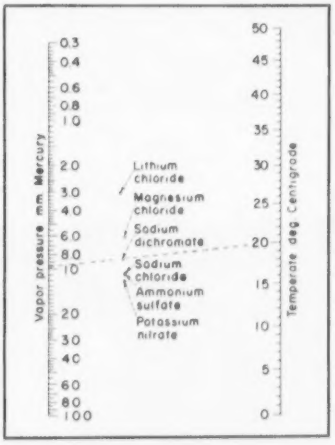
contamination of baked goods with brush bristles.

It consists of a pair of cellulose sponges (A in sketch) mounted on the cutter mechanism of a roll table. And it uniformly and rapidly egg-washes all types of rolls—even hard rolls—prior to applying poppy, caraway, or sesame seeds.

Sponges are secured lengthwise in a rectangular angle-iron frame with eight ⅜-in. dia., 1½-in. long bolts. When pressure is released sponges expand and are snugly held in position.

Wash is fed from a ½-gal. glass or stainless steel container (B) mounted above the cutter housing, through a flow-adjusting valve (C), into a horizontal, perforated stainless pipe (½-in.), then onto the sponges.—*F. G. Wheeler, Armour and Company, Chicago. (From an address delivered at annual meeting of Amer. Soc. Bakery Engineers).*



Guide to Vapor Pressure

Here's a handy chart for finding temperature-vapor pressure relationships of saturated solutions of various chemical salts.

These solutions are useful for maintaining constant vapor pressure atmospheres for storage studies, packaging, hygroscopic equilibrium determinations, and calibration of hygrometers.

To find the proper salt for a particular test condition, run a straight edge across the nomograph so that it intersects at the desired temperature and vapor pressure. Then choose the central point (numbered 1 to 6) closest to the line to find the right salt.

Following the dotted line we see

Oakite delivers the grand slam in sanitizing!

If you want to knock your sanitizing problems right out of the ball park, fill the new Oakite SANISEPTOR with Oakite CHLOR-TERGENT and put this winning team at bat. You'll be way ahead on the score of powerful cleaning action, instant bacteria destruction, complete deodorization . . . speed, ease, and economy.

OAKITE SANISEPTOR. Replaces costly hand-cleaning. It's the newest, simplest in mechanized cleaning. No pump, motor, steam supply or installation of any kind needed. Just fill with proper detergent and attach to any hot-water outlet. Turn a valve and you throw a jet-stream of hot sanitizing solution wherever you aim. Turn another valve and you pressure rinse. Operates on Venturi principle, at line pressure. Weighs only 25 lbs., can be used everywhere in the plant—for sanitizing holding tanks, vats, floors, walls, equipment.

OAKITE CHLOR-TERGENT is the new, modern chlorinated detergent that does three sanitizing operations in one: powerful, speedy removal of soils, instant bacteria destruction, effective deodorization. It is safe on all surfaces—metal, rubber, wood, plastic, and its chlorine content is stable at high temperatures. Effective in concentrations as low as ½ oz/gallon, giving outstanding economy. Use it throughout the plant, apply it any way you wish—but to get more speed and economy, use it with the Oakite SANISEPTOR.

Talk to your local Oakite Technical Service Representative about mechanizing your sanitation operations with the Oakite SANISEPTOR and Oakite CHLOR-TERGENT, or write for details to Oakite Products, Inc., 27A Rector Street, New York 6, N. Y.

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STAINLESS STEEL KETTLES

JUST think! Over three quarters of a century building fine cooking and mixing kettles for industry. These quality units, engineered and designed by the finest craftsmen, insure higher efficiency, labor-saving and cost-saving operation. There's no substitute for the best—"Hamilton." When it comes to mixing, the agitators, the drives are designed for longer life and these rugged sanitary units have proved themselves in operation. The Steam, Jacketed Kettles are fast-cooking, easy-cleaning, precision-built.

If it's the best you want—then you want "Hamilton," the foremost designers and producers of the finest kettles to mix and cook. There's a "Hamilton" to suit your specifications so why settle for anything but the best, a "Hamilton" Stainless Steel Kettle.

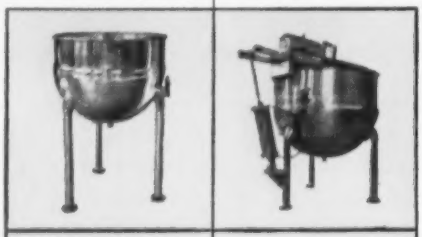
STYLE SA
Streamlined design, balloon jacket. Extra large diameter provides greater heating surface, efficient cooking. Sizes range from 15 to 500 gallon. A.S.M.E. Code constructed for steam working pressures of 40, 90 and 125 pounds.

STYLE CW
Designed to process large batches up to 150 gallons. Positive worm gear and handwheel give complete control of large capacity loads while tilting. Large diameter kettle gives fast, even cooking. Sizes from 30 to 150 gallons.

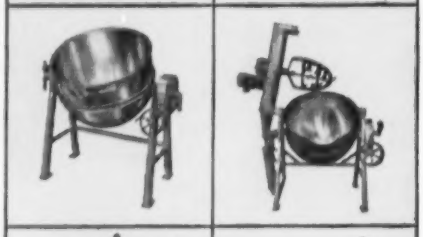
STYLE PC
Stainless steel pressure cooking kettle, designed especially for meat and poultry processing. Balloon jacket gives increased heating capacity. Built for 90 p.s.i. in jacket and 15 p.s.i. in kettle. Has quick opening latches. Top is lifted by eccentric lever. Sizes 30 to 250 gallons.

STYLE VT
For small batches this unit has no equal. Vacuum cooker with tilting top, easy loading. Sizes from 30 to 150 gallons. Sanitary design throughout. Jacketed for 90 p.s.i. steam working pressure.

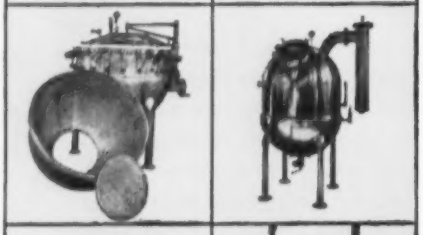
STYLE SB
Shallow type kettle with balloon jacket. Streamlined for complete sanitation. A.S.M.E. Code constructed for working pressures of 40, 90, and 125 pounds. Sizes range from 15 to 350 gallons. Larger size kettle can be furnished to meet specifications.



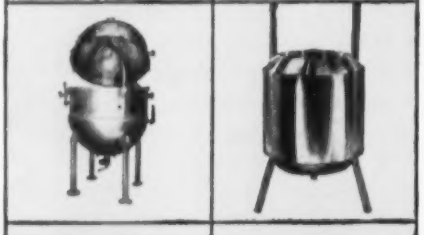
STYLE SA MIX COOKER
Standard SA Mix Cooker has either single motion or double motion agitator with or without hydraulic lift. With hydraulic lift agitator lifts easily and smoothly out of cooker. Sizes range from 30 to 500 gallons.



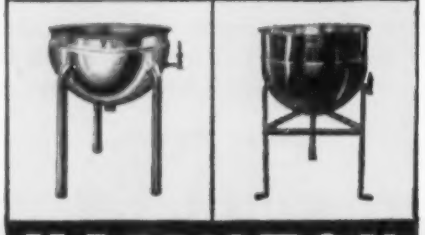
STYLE CW MIX COOKER
Large diameter gives fast even cooking. Hydraulic Lift tilts agitator smoothly and easily out of tilting kettle. Available for 40, 90, 120 pounds steam working pressure.



STYLE HV
A vacuum cooker for large capacities from 150 to 500 gallons. A hinged manhole is provided for access to the inside. Available with a mixer — circulator can be installed to increase heat transfer and agitation.



CIRCULATOR
Stainless steel steam immersion heating unit can be installed in any kettle regardless of size or shape. Gives extra heating surface at the center of kettle. Creates thermal agitation. Speeds up cooking 45%.



STYLE A
General purpose steam jacketed kettle used in processing food, drugs, and chemicals. Full ⅔ jacketed. Sizes range from 15 to 500 gallons. Also available in Type 316 stainless steel or nickel. Larger sizes to meet specifications.

KETTLE SPECIALISTS

HAMILTON

SINCE 1876

DIVISION OF BRIGHTON CORP.... 820 STATE AVENUE ... CINCINNATI 4, OHIO

Practical Ideas

that, to obtain a vapor pressure of approximately 10 mm. mercury at 20C., sodium dichromate is best suited. More precisely, at 20C. the vapor pressure of saturated sodium dichromate is 9.7 mm. mercury.

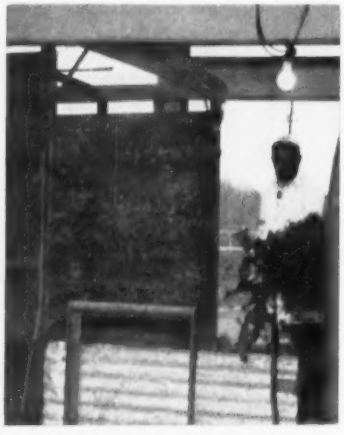
The chart is based on data determined by the National Bureau of Standards (*Research Paper* 2512, July, 1954), but extends the usefulness of the data by presenting a range of vapor pressures from 0 to 50C. at 1-deg. intervals. The scale includes vapor pressures from 0.3 to 100 mm. mercury (representing 14 to 97% relative humidity).—*J. T. Hogan, Chemical Engineer, Arabi, La.*

Guard Underground Piping

Here is a way to effectively protect your underground piping—and at low cost:

Simply backfill the trenches with granular Gilsonite material consolidated in an impervious, insulating jacket.

This is reported as a particularly economical sleeve-type safeguarding. —*Technical Bulletin, General Foods Corp.*



Flashing Light Sets Pace

We are now getting coordination between the men loading produce onto the initial belt outside the plant and the requirements of the production line inside.

We have rigged up a timing switch (Automatic Temperature Control Co.) to control a light (see photo above) visible by the men loading the outside belt. Vernier

Another Goodyear First:

V-Belts

with the Green Seal

stay matched from factory to drive

The Green Seal signifies true dimensional stability. It means that now when you reach for a matched set of V-belts, you can be sure they're matched – no matter how long they've lain on the shelf. And that means longer life and a minimum of down time.

It used to be that only steel-cable V-belts by Goodyear were length stabilized. But now, through the miracle of Triple-Tempering, they've been joined by all the other Goodyear Industrial V-belts.

Triple-Tempering is the exclusive process wherein synthetic cord is carefully brought to the peak of strength and stability by controlled tempering with Tension, Temperature and Time. And this gives you not only *length* stability in storage, but greater shock- and stretch-resistance on the drive.

In addition to 3-T load-carrying members, the Green Seal also brings you "balanced construction." This means each component of the belt is specifically designed to its job to give you cleaner, smoother, longer running which adds up to maximum, trouble-free horsepower hours at minimum cost.

The next time you need V-belts, be sure they're wearing the Green Seal–the mark of a V-belt made with the technical know-how of the world's largest rubber company. They're readily available at your Goodyear Distributor. Or write for details to Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

DIMENSIONALLY STABLE V-BELTS by

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Green Seal—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

Aluminum Foil Packaging– Advantages of High Thermal Conductivity

Report No. 9 of a Series by Reynolds Metals Company

Thermal conductivity is a property often overlooked or considered of little consequence in the selection of packaging materials. Growth of the frozen and refrigerated foods industry, however, is placing increased emphasis upon the thermal properties of the package. Frozen foods producers are interested in faster and more efficient freezing. Grocers are interested in obtaining maximum efficiency from storage cabinets – which are frequently overworked. And, of course, the ultimate consumer is interested in rapid thawing or heating. The high efficiency of aluminum foil as a conductor of heat makes it unique among flexible packaging materials.

Both freezing and thawing can be speeded by aluminum foil's high thermal conductivity – by faster removal of heat from the package in air blast, plate or immersion freezing, and by faster transfer of applied heat into the package in thawing. On the other hand, where heat is conveyed by radiation rather than by contact, the high radiant heat reflectivity of aluminum foil will retard thawing rates.

Still other benefits are to be gained in storage situations where it is important to minimize temperature fluctuations. As an illustration, the accompanying graph shows the temperatures of ice cream in pint packages of waxed fiberboard cartons with and without aluminum foil overwraps. These packages were stored in an open top refrigerated display cabinet typical of those generally found in self-service markets.

It is a well documented fact that ice cream deteriorates rapidly through softening, shrinking and coarsening of texture if the temperature rises even a few degrees above its proper storage temperature. The most severe test of the packaging material, naturally, takes place in the top layer of the storage cabinet since exposure to radiant heat and convection currents is greatest at that point. Practical experience shows that ice cream in this location does, in fact, deteriorate most rapidly.

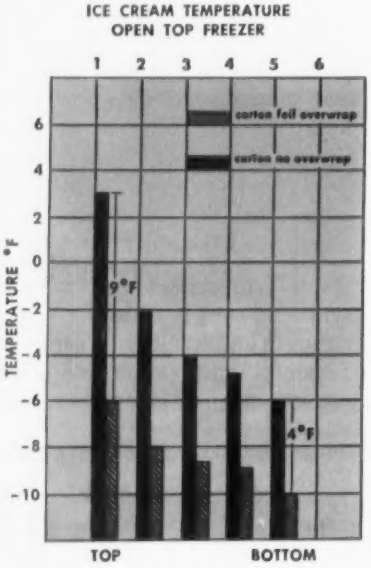
Test results shown in the graph indicate that, in this most exposed layer, the ice cream in foil wrapped cartons was held at 9° F *lower* temperature than ice cream in plain cartons on the same layer.

Even in the bottom layer, where radiation and convection are minimized, the temperature of foil wrapped ice cream was maintained at 4° F colder than ice cream in plain cartons.

Two properties of the aluminum foil wraps were responsible for maintaining these important lower temperatures. First, the great reflectivity of aluminum foil reduced the temperature rise due to radiant heat. Second, the high thermal conductivity of the aluminum permitted the gained heat to be conducted downward to the colder areas of the cabinet where it was effectively removed by the refrigeration equipment.

The absolute temperature values are not the significant point. What is significant is that the ice cream in plain cartons on the upper levels deteriorated while the foil wrapped ice cream on the same levels did not because lower temperatures were maintained.

Your local Reynolds representative will be glad to show you how aluminum foil packaging can best meet your individual problem. Or you may write direct to **Reynolds Metals Company,** General Sales Office, Louisville 1, Ky.

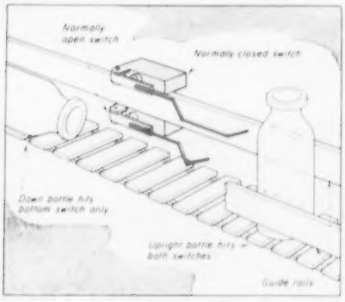


See "CIRCUS BOY", Reynold's new dramatic adventure series, Sundays, NBC-TV Network.

©Reynolds Metals Company, Louisville, Kentucky

scales on the switch permit control of both the interval of darkness between lightings and the duration of the light.

Getting an even flow, not too little and not too much, of produce into the plant is now simply a matter of instructing the loading crew how much to unload with each light. For instance, when the photo was made, the man was instructed to deliver three shovelfulls of spinach each time the light went on.—*Webster McAllen, Plant Superintendent, Phillips Packing Co., Cambridge, Md.*



Fallen Bottle Detector and Conveyor Control

If a milk bottle falls over while on the conveyor which leads to the bottle filler, parts can be seriously damaged, causing down time and costly repairs. To avoid any chance of a fallen bottle reaching the filler, we arranged a dual Microswitch control which has proved completely dependable.

The top Microswitch No. BZ2RL is a normally closed switch. It is located so that the extension rod welded to the actuating arm of the switch extends over the conveyor at a height to make contact with an upright bottle, but not low enough to be affected by one traveling on its side. The lower Microswitch is a normally open switch.

So long as upright bottles pass along the actuating arm of the upper control the circuit to the conveyor drive motor remains closed.

When there is no bottle the lower switch is in operation and therefore does not interrupt the circuit. However, a fallen bottle does not close the upper switch but does operate the lower Microswitch, to thus break the circuit to the drive motor and stop the conveyor.—*Darl H. Peabody, Electrician, Lockshore Farms, Inc., Kalamazoo, Mich.*

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Here's Another New Development from Dempster Brothers to cut

Now Automatic Pick-Up of Dempster-Dumpster

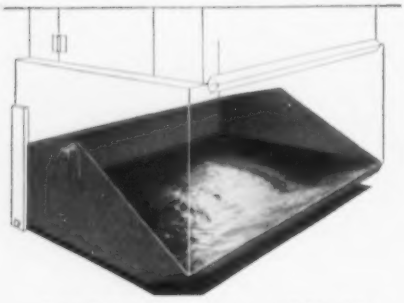
AUTOMATIC PICK-UP!

TRAVELS SMOOTHLY . . . HANDLES EASILY!

Here's a container adapted for collecting dust from two 75-ton furnaces.

Containers can be served inside buildings.

Dempster-Dumpster handles extremely heavy materials like this Fullers Earth.



Sump Bottom Containers are available. This leak-proof feature is desirable wherever moist, liquid and wet refuse is a problem.

Tilt Type Containers for handling liquid and solid materials are available.

Adaptation like this one for handling cinders from furnaces illustrate another flexibility advantage of the Dempster-Dumpster system.

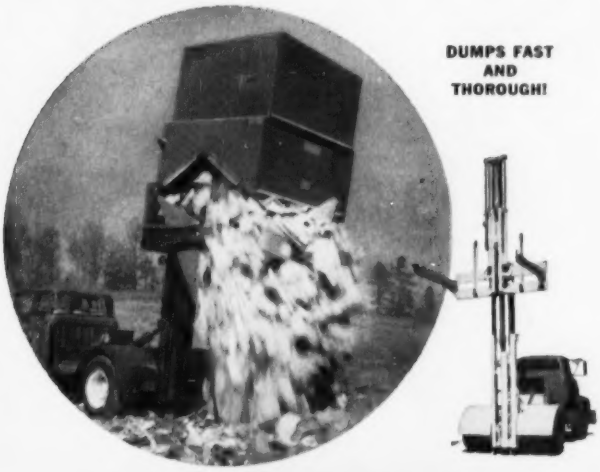
THE DEMPSTER DUMPSTER® SYSTEM

DEMPSTER BROTHERS

767 Shea Building, Knoxville 17, Tenn.

Materials Handling Cost in Food Plants - - -

Containers— Driver Never Leaves the Cab!



DUMPS FAST AND THOROUGH!

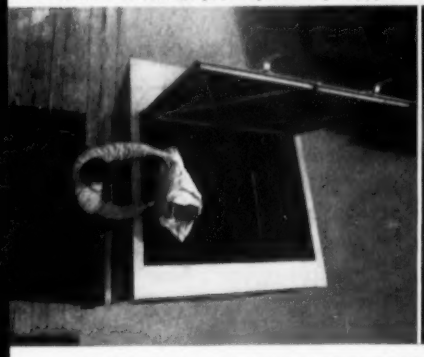
Here is an achievement that leaves little, if anything, to be desired in the handling of bulk loads with big steel Dempster-Dumpster Detachable Containers . . . another flexibility advantage available only in the Dempster-Dumpster System! The GRD 304-F-2 is a truck-mounted Dempster-Dumpster with fork-like arms. It enables containers to be picked-up, hauled, dumped and returned to location without driver ever leaving cab. All this, plus shorter turning and maneuvering area requirements, and plus high dumping — a versatile range of dumping heights up to approximately 11′. This new Dempster-Dumpster offers many advantages for speeding-up handling of bulk material loads in big Dempster-Dumpster Detachable Containers that are worth consideration in your plant now! Write us today for complete literature on this new Dempster-Dumpster. Or, if your operation would require greater payload handling capacities, ask us about our Dempster-Dumpsters built to handle payloads up to and over 36,000 pounds, plus detachable containers up to 21 cubic yards in size. Manufactured by Dempster Brothers, Inc.

And services Skip Type Containers having required bale.

Acid materials like these stripped battery cases are just a sample of the type of wastes handled.

Many Standard and Special Tank Type Containers for handling liquids, chemicals, oils, etc., are available.

Big 15-yard Universal Containers are available. Note the area of the top opening. Standing in the container you would see the view as camera pictures it at right below. "Like trying to fill a bottomless pit," report many happy users.



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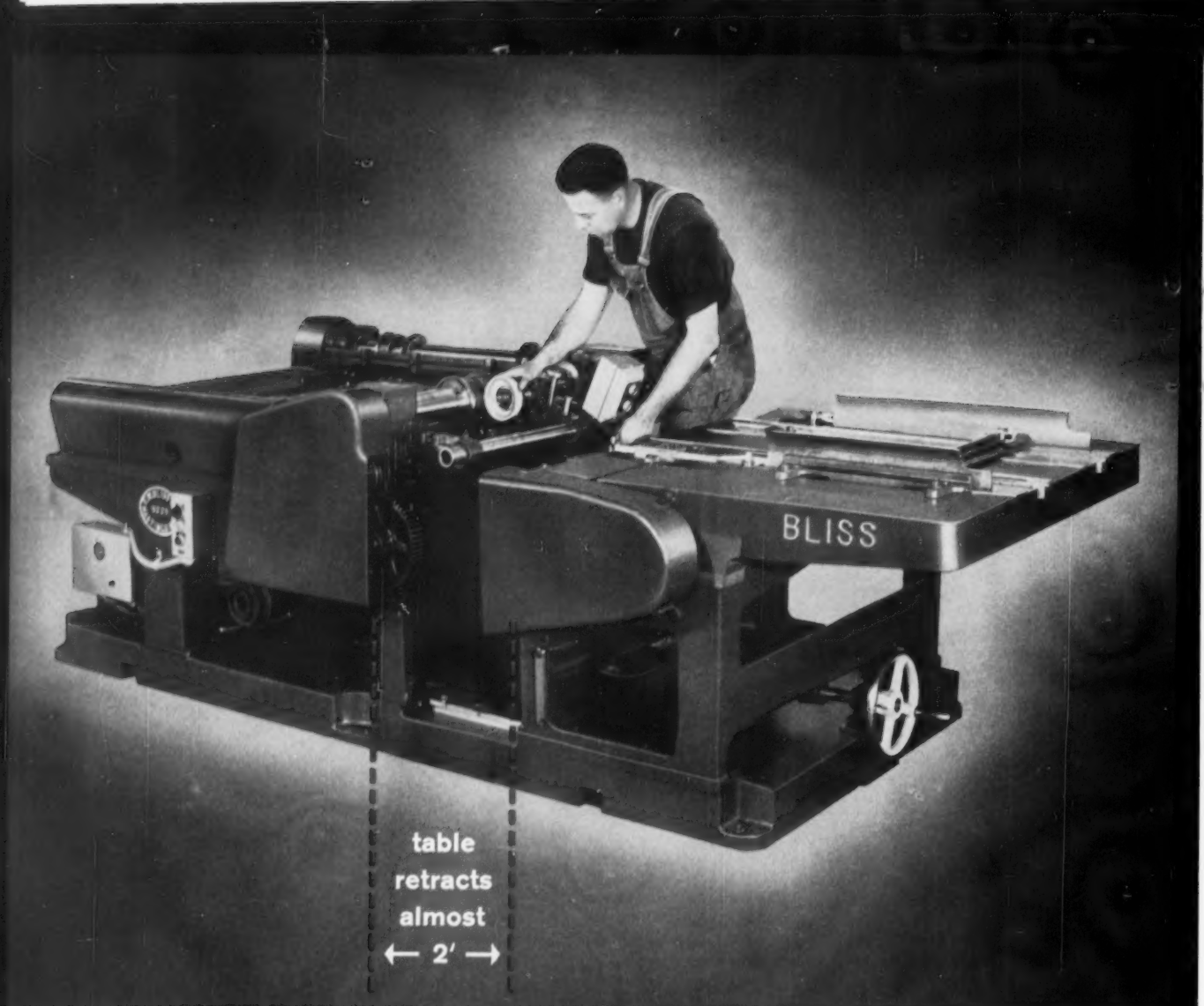

Only this new Bliss Duplex Slitter can save you so much time

You can slash hours off every cutter regrind with this new slitter. That's because the first table retracts almost two feet—lets you get right in at the cutters. Simply attach the motor-driven grinder, then sharpen the cutters in place.

This accessibility also simplifies set-ups and changeovers. And making things even easier is the exclusive design of the bearing housings—they're quickly removed, easily replaced. The side and back gages, too, are easy to reach and adjust, speeding up the entire process.

In short, Bliss' new duplex slitter cuts the heart out of downtime. It saves hours every time you sharpen or set cutters. Whether you slit body blanks or trim and square tinplate, you'll like the accuracy and speed of this most modern of slitters. For complete information write for a copy of our new slitter catalog.

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Time for Industry to Speak Up on Education

Some 20 universities and colleges are turning out young men trained in food technology and engineering. These youngsters are supposed to be equipped to contribute to the advancement of the firms who hire them. Yet there is no accord among the schools, nor among members of the Institute of Food Technologists, as to how they should be trained.

Obviously, the ultimate objective of teaching young people food science and engineering is to qualify them for careers of contribution to food manufacturing and research. Therefore, food company executives better start steering the schools.

Good Grasp of Basics Needed

If you are operating in but one segment of food manufacturing, your off-hand reaction may be that you want a technical youngster who specialized in your branch. But think it over carefully before you make that recommendation to the schools.

The technical talent that will do you the most good over a period of years is that which has a solid broad-gage grasp of the basic science and engineering involved in food manufacturing and processing.

Such talent can tackle problems involved in current operations and future progress at the roots. It can draw upon the fundamental principles of all related sciences and engineering arts to get at the heart of the problem. It can come up with answers that constitute fundamental contributions to advancement.

In short, what you need is a true scientist or engineer—one with a thorough understanding of the technology of the field.

What you don't need is a technician who knows little more than your specialty—as it has been done in the past. His knowledge will tend to keep you where you are progress-wise. Furthermore, he may not be as capable an individual as the real scientist or engineer.

Stiff Training Weeds Out Less Talented

There is a "hidden" advantage in the tough kind of technical training that creates a true broad-gage scientist. It either scares off, or weeds out, the less talented, the less determined, the less dedicated youngsters.

Keep another factor in mind, too. It is relatively easy for the technical man well grounded in fundamentals to latch on to your specialty. And then you really have an asset.

The trend in technical education definitely is to the broad—the unspecialized. Courses in older branches of engineering are fast becoming more and more alike—with deeper grounding in the all-important fundamentals.

Best bet for our industry is to go along with this trend. Specialization can come in graduate training or on the job—or both.

Your future progress depends upon an adequate supply of technical know-how. So you better make yourself heard in food educational circles.

The schools are confused. Likewise the IFT. Knowledge of what you need will align their thinking.

After all, they are producing raw material for you. They must meet your specifications.

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Where you encounter acids, salt and alkaline solutions, sea water, brine or other corrosive fluids, vapors or gases, you'll want Jenkins Ni-Resist Type 2 Cast Iron Gate Valves with type 316 stainless steel trim. They have a remarkable ability to withstand destructive corrosion and erosion.

In paper mill service, food processing, petroleum refining, chemical plants and other process industries, Jenkins combination of Ni-Resist type 2 cast iron and type 316 stainless steel, plus Jenkins extra *value* construction throughout greatly extends valve life.

Designed especially for corrosive services, the Jenkins Ni-Resist line of gate valves also has superior metal-to-metal wearing qualities. Copper-free, they will not discolor or contaminate products being carried in the line. Let the famous Jenkins Diamond be your guide when choosing Ni-Resist valves . . . it means longer, trouble-free service.

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BY TEAMING EFFORTS, traffic men can go far in smoothing our industry's rough road—as demonstrated by this Calif. Canners League body. It's grappled with national as well as local carrier issues. L. to r., Bruns (Heinz), Wall (consultant), Larison (Haw. Pine), Roney (S & W), Marsh (secy-treas. Canners League), Porton (Libby), Murphy (Canners League), Cole (Stokely), Sanders (Gerber), and Edwards (Hershel). Chairman is Author Labagh (right).

You Need a Mighty Capable

TRAFFIC MANAGER

P. STEELE LABAGH
Traffic Director, California Packing Corp., San Francisco

Out the window has gone the old idea that he should just stick to his technical specialty. Instead, it's now demanded that he take a strong hand in related business affairs

THERE'S NOTHING ORIGINAL in the statement that "Every firm pays for good traffic management, and those that don't have it pay most!" But the truth of this observation is constantly—and more and more positively—being driven home to management.

Companies that process food are certainly no exception. In fact, they need the services of efficient traffic personnel even more than most enterprises.

And size doesn't eliminate the need for efficient traffic direction, either. Rather, it's likely that the benefits will be reflected even more in the profit margins of small companies. Their traffic organizations may not be as extensive as larger ones, but their basic functions are every bit as important.

Traffic Manager Develops Ideas

Now let's find out what can be expected from a first class traffic manager.

Of prime importance is the fact that he will develop new traffic and distribution applications of which management would be unaware.

The alert t.m. takes advantage of these as part of his duties. Further, his responsibility is heightened because he usually is the only man having enough knowledge and contacts in the field to convert facts into workable ideas.

Many companies rely more on the sometimes doubtful efficiency of established practices than on the de-

Door to New Values

Each year more and more food managements come to recognize the importance of the traffic function. Need for savings make this mandatory.

Realizing the urgency, one of the largest companies had placed its traffic man in the position of general manager of distribution. Another has made its t.m. a vice-president—giving him full responsibility for corporate transportation, warehousing, and distribution services.

Many traffic departments actively encourage employees to expand their knowledge through specialized training. The American Society of Traffic & Transportation has a series of five courses designed to further qualify individuals.

More is needed than background studies, however. A positive job-training program within the department is essential. And rotation of assignments is particularly useful.

Traffic management's growth is not limited to any particular phase of business operation. Rather, it cuts across the entire spectrum.

There is a great opportunity ahead for the ambitious traffic employee. There is an even greater opportunity for the food firm in obtaining competent traffic management.

As someone has aptly said, "There is no branch of business today, and there will certainly not be in the immediate future, where the return is as great for each dollar of capital investment as in the field of materials handling and traffic management.—P. S. L.

velopment of new procedures. The precepts of traffic management forbid such an approach. The reason, of course, lies in the dynamic nature of transportation.

Special uses, privileges, and procedures are not necessarily to be found by consulting a carrier's agent or by mere reference to a shipper's guide, or tariff. Rather, "transportation imagination" is essential.

A good traffic man will research the field in order to come up with ideas from which to develop a sound program. He discovers decisions favorable to his company's cause and converts them to its benefit.

Thus, the corporate traffic manager holds a key to important competitive advantages to his company. It is his job to utilize the flexibility of transportation practices and originate economic and/or more efficient means of distribution.

The traffic field has never been so routine that better plans cannot be developed. And, more important, the ever-changing pattern of transportation constantly creates new options and avenues of approach.

As in the business climate generally, it's that step or two ahead of the trade that marks success or mediocrity.

New Frontiers Seen

Every company has distribution problems, and it takes initiative and research to solve them. But let's get down to specific examples:

A few years ago, the railroads developed the Damage Free and Compartmentizer cars. As with many other new ideas, their acceptance was slow. The average shipper viewed them with certain misgivings.

In contrast, the alert traffic man, analyzing the potentialities of this new equipment, realized that they would reduce damage claims, were ideal for stop cars, and could be used as a customer goodwill factor. Immediately, he went to work selling his shippers and consignees on the advantages of these cars.

Working closely with the railroads, he shipped a maximum of such carriers and established his company's requirements before his competition got around to seriously thinking about the problem. Long before these cars were fully accepted by shippers, this man had reaped the benefits of them.

Another example is the traffic manager who, on analyzing the distribution problem of his company, realized that a transit warehouse was the primary need. Thoroughly researching geographical locations, working closely with the railroads, and delving into stock allocation problems, he proposed a plan to management for this major change.

His plan was well-crystalized when it was presented. It was accepted subsequently, and annual savings running into many thousands of dollars resulted. This plan could not possibly have been developed by management alone. The initiative and technical know-how of the traffic man converted ideas into a gold mine of savings for his company.

Numerous Examples

Here are other achievements of note: The traffic manager who completely revised a management plant-location decision to save his company thousands of dollars; the introduction of palletized shipping that removed a serious bottleneck in product warehousing; the concept of bulk shipment of raw product where costly containers had been used previously, and still another case—the reduction of weight of fiber shipping boxes without impairing protective characteristics.

This latter instance resulted from coordinated testing and research on the part of the food processor, the carrier, and the fiber box manufacturer.

The point is clear: Traffic managers cannot sit idly by and merely police a stagnant system. The man who utilizes only current practices, without seeking improvement, soon falls behind.

Actually, the significance of the individual traffic manager's performance goes deeper than his own personal or company development. In many ways he is in a position to participate constructively in the growth of the nation's transportation system.

Traffic Manager Develops Policies

The conscientious traffic man, whether he represents a small or large food concern, has a three-fold responsibility: (1) to his company, (2) to the food industry, and (3) to the developing economy in general. Growth of transportation and traffic is a reflection of the combined efforts of these men.

This philosophy clearly places a definite responsibility on traffic men to represent management in assuming positive stands on controversial transportation issues. Here again, even the small company should not sidestep decision. In the long run this very apathy will carry over to other issues, and the company will voluntarily surrender any claims to progressiveness or leadership.

A good example of this reasoning is in the currently controversial motor carrier agricultural exemption issue. Section 203 of the Interstate Commerce Act specifically exempts

motor vehicles used exclusively in carrying agricultural commodities from all but safety regulations of the Act. It defines these commodities to a limited degree, but specifically denies the exemption to "manufactured products" of agricultural commodities. It is over the interpretation of what manufactured products really means that the major controversy has been waged.

There have been a whole series of court cases on the issue, and the general trends have been toward broadening the list of commodities falling under its protection. In a recent case, the Supreme Court upheld a lower court decision that certain frozen foods retain their "substantial identity" as agricultural commodities and are thus exempt. Apparently, clarification of this section of the act is required, and the job belongs to Congress.

Effective Group Actions

This issue must be faced squarely by both frozen food and canned food processors. The decision may not be an easy one, but the firm that does not meet the question head-on is procrastinating.

As representatives of their managements, traffic managers working individually—or more practically through associations—must make their conclusions known to those who will be actually framing the legislation.

Joint thinking of many different companies and industry representatives guarantees much more studied and practical recommendations. Needless to say, these representative groups command a more attentive ear from the framers of laws than individual or company could ever claim.

The national Industrial Traffic League is a good example of such an organization. Its internal committees are organized in such a manner that proper research and examination are devoted to all key issues.

One of the most progressive and constructive food associations is the Canners League of California. This organization has been very active in thoroughly investigating important issues in the industry.

An important subdivision of the Canners League is its vital Traffic Committee, which has established an excellent record as a representative agency of research and member expression. It has taken a prominent part in both local and national transportation issues.

With representation from large and small canners alike, this committee has made forceful presentations at freight hearings, pioneered claim prevention methods, investigated transportation problems and, in general, devoted coordinated effort wherever needed. Logically, a food processor would find numerous advantages from consolidated thinking and planning such as is available in such an association.

There are many other useful transportation associations. For example, the Shippers' Advisory Boards promote cooperation between shippers and carriers at a constructive level. The examples we have cited, however, are clearly indicative of the fact that food companies have a responsibility—as well as an incentive—to participate in the work of transportation associations.

Traffic Management Has a Selling Job

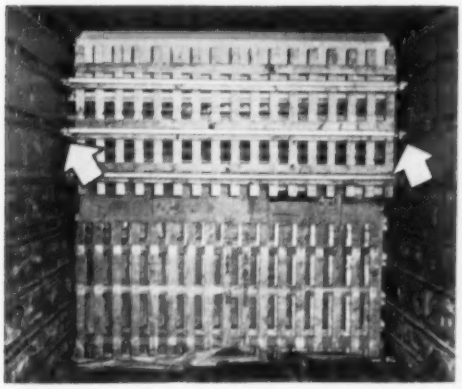
Despite the accomplishments of successful traffic departments, the manager usually has a selling job on his hands when proposing changes and advances. In many companies, the essential functions of the job have not been clearly delineated. Here, a real challenge exists, and the stakes are substantial both for the company and the man. For he must be capable of forcefully presenting concise plans or proposals to achieve management's cooperation.

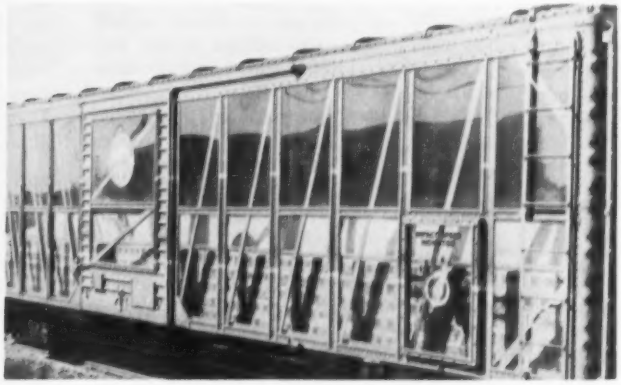
Cooperative functions of traffic work in the management fabric offer fertile fields for developing the department's real worth. The opportunity to render both solicited and unsolicited assistance to other departments or executives is ever present, and the results of efficient performance will lead to still greater responsibilities.

By developing transportation applications that would never occur to other members of management, they are developing new business frontiers on uncharted routes.

As a capable administrator, the t m.'s area of interest stretches be-

"On the Ball" TM's Keep Abreast of New Developments





TWO ADVANCES that alert managers have eyed are the Damage Free and Telavue cars. DF carrier (left) uses deck boards to adjust shipment to space requirements. Boards are held in place by metal bars that clip to perforated rails (arrows). "TV" car (right) has Plexiglas panels that permit visual observation of cargo shifts. Impact indicator (right) shows car speed. Further, there are lights that flash red for unsafe speed, orange for high impact, green for safe speed.

yond the routine tasks generally considered as traffic management. Yet, in the operation of his department, he need not be exposing himself to the charges of inter-departmental pirating or aggrandizement. His job is primarily one of assistance to other divisions, and for this reason he is generally afforded a staff advisory position in the company.

Some small food processors may feel that traffic managers are not necessary. The facts are quite to the contrary. Traffic advice and traffic analysis are essential for every food company—whether they come from a full department, an individual specialist, or an outside consultant.

Real Opportunities Ahead

Industry has found that good food traffic men are available only at a premium. The rapid growth of transportation awareness in recent years has resulted in a shortage of capable traffic personnel. Only recently have traffic and transportation courses become available generally in our business schools and colleges. Yet, even with a good educational background, traffic men are not developed overnight. The added requirement that a transportation specialist develop a broad business perspective has further narrowed the supply of qualified personnel.

There is real opportunity in this field for those willing to accept the challenge. The path is far from standardized, and the person in traffic work has a chance to establish his own goals within broad framework set down by his company. —*End*

Puts in 23-Ton Unit Without Rift in Output

Carefully figured out beforehand, exceedingly tough 2nd-floor job goes off smoothly in mere 27 hr . . . Winning workers' cooperation is big factor in easing task

FE STAFF

INSTALLING huge 23-ton machines certainly isn't an every-week routine at Abbotts Dairies, Inc., Philadelphia.

—But a person might have thought it was, considering how the company's big new bottle washer (photo) was "inside and operating" just 27 hr. after a giant trailer had edged it into the narrow street alongside the 31st St. plant.

Demand for the new 2-qt. bottle size dictated purchase of the unit. And that posed this problem:

How was it to be put into place without unduly upsetting either the production schedules or the employees who were responsible for keeping those schedules?

Abbotts is the kind of outfit that puts great store by worker morale. So with out-of-the-ordinary projects like this—involving long overtime periods and personnel changes—the company gives priority to the factors of employee reaction.

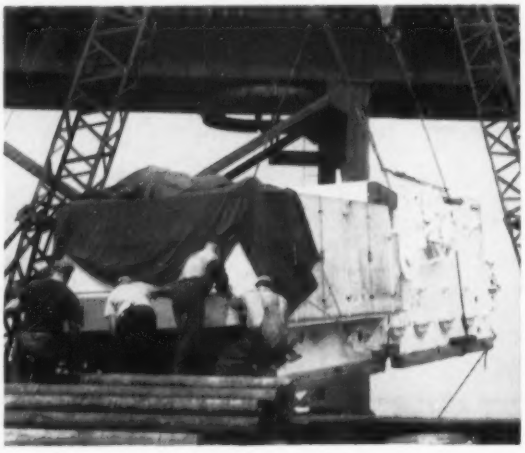
Workers Alerted

In this instance, it instituted communication with the people affected by the department changes involved. "Transfer, don't dismiss" has been the personnel policy where new setups require less workers.

Here, the new bottle washer was going to save one-third the labor man-hours—but it was emphasized to the crew that no lay-offs would result.

Another employee situation causing concern involved the maintenance crew. These men started work at 8 a.m. the morning the new machine—a Meyer Dumore unit—arrived. And they stayed on the job throughout the following night, to have the unit "all set" when needed at 11 a.m. next morning.

As it turned out, this crew was no problem. The men considered this important project as a challenge. They took the task in stride. And they got time-and-a-half for their overtime.



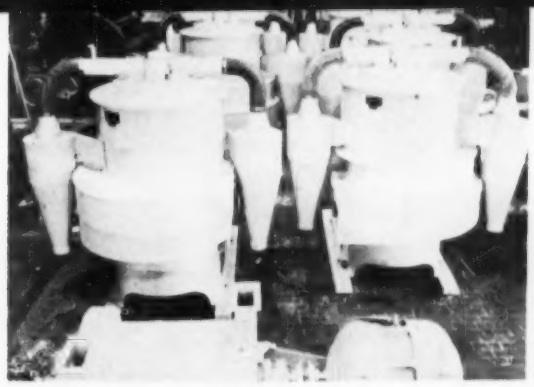
EASING KING SIZE UNIT off trailer on street and up onto rollers on plant roof (foreground) was ticklish job requiring two big cranes and a dozen husky trained men.

How It Went In

Of course, Abbotts' own men weren't prepared to handle the whole job. A heavy equipment mover, Bolger-Parker Co., was consulted. Then the most practical method was decided upon. This involved reinforcing the roof, using logs to roll the washer across the roof, removing a brick wall, and temporarily displacing a conveyor. Bolger-Parker arranged for skilled crane operators to lift the washer from trailer to roof.

True enough, the washer could have been handled in two parts. But since this would have taken longer, the idea was dropped. For it was requisite that the washer be in and working as soon as possible. —*End*

Pillsbury's high-speed grinding and classifying sets new standards of product uniformity. 'Turbo' units grind grain to sub-sieve range—tailor-milling flour to specific needs . . . Equipment and operation described



TURBO-MILLING UNITS use the air-vortex principle for ultra-fine grinding and efficient classification. Separators, which operate with high air dilution, permit close control of distribution by particle size.

New 2-Step Process Boosts Milling Precision

A MAJOR ADVANCE in fine-grinding and classifying is seen in a new precision-milling process.

Just announced by Pillsbury Mills, Inc., Minneapolis, the two-step technique (called turbo milling) employs a combination of impact and fluid energy of particles in a high-velocity air stream to reduce material to the sub-sieve range. Then, a unique classifying method is used to separate particles—one-sixth the size attainable with the finest silk screen.

In effect, these particles are ground and separated in man-made "hurricanes."

The company's applications for broad patents, covering use of the process both in the U. S. and abroad, aim for exclusive rights in the milling field.

This process opens the door to sharper control of size-reduction for greater product uniformity. To the baker, it offers entirely new types of flour that differ both chemically and physically from those obtainable by conventional milling. In fact, a flour can now be tailer-made for each baking requirement—without the need for blending grains prior to milling.

By means of a phenomenon known as "protein shift," ordinary flours may be refined into various commercial fractions that are especially suited for making bread and rolls, and others with excellent cake-baking properties.

Typical of these special-purpose flours is a product (Beevo) with protein content above 20%, yet low in ash. It is characteristic of short-patent flours but, as noted, is unusually high in protein. This composition results from the milling process alone, since there is no addition of dried gluten or other materials not originally found in the wheat kernel.

Bakers report that doughs made by combining this high-protein flour with standard patents enable better loaf volume, stronger but tenderer crusts, more symmetrical loaves, and easier machining.

Now for a closer look at this advanced milling process:

Key to this precision milling is an advanced mill and classifier unit.

The mill employs a vertical rotor with radial blades that are segmented on the shaft by disks. In operation, air vortices are created between the blades, which run clear of the housing. Rotor turns at 1,500 to 2,500 rpm. to produce peripheral speeds ranging up to 30,000 fpm.

Size reduction is accomplished by a combination of actions. Initially, material is ground to relatively coarse particles by impact-in-air. Then inter-particle abrasion and attrition in air vortices between blades do the fine grinding to a size of less than 1 micron. In addition, there is some impact of particles against sides of the mill.

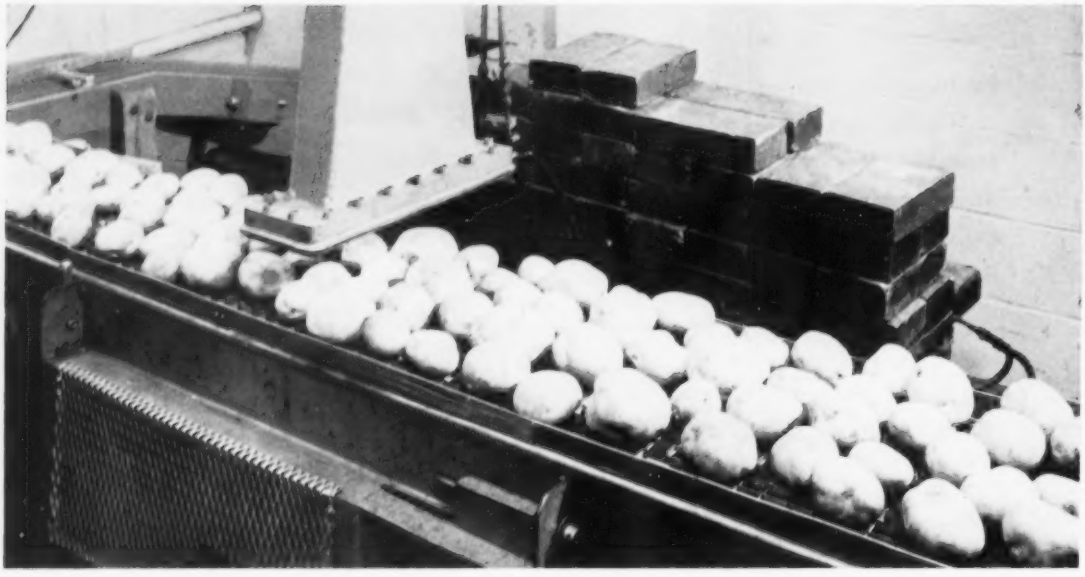
The classifier is a centripetal machine with peripheral inlet and axial outlet. Its action provides high air dilution, which permits ground particles to follow inertial forces for highly efficient separation.

This equipment is manufactured by Microcyclomat Co., Minneapolis, which has Pillsbury as exclusive licensee in the milling field. Distribution of units for products not related to flour milling is handled by a subsidiary (Hurricane Pulverizer Co.).

Other Equipment Under Test

Meanwhile, there is considerable interest in other size-reduction units which, in combination with existing classifiers, are being studied to do a similar job of fine-grinding and separating.

The grinding might possibly be done by an impact mill, such as a new 40-in. unit (Entoleter Div., Safety Industries, Inc., New Haven, Conn.), which is not yet in commercial use on flour. And classification might be accomplished by air-vortex machine. One such series (Sharples FE. Dec. '56, p. 115) now handles 5 and 10 tons per hr., and units will soon be available in capacities to 30 tons per hr. —*End*



THIS VAN DE GRAAFF ACCELERATOR (High Voltage Engineering Corp.) produces beams of high-velocity electrons by converting conventional electric-line power to electron power. Here, potatoes are irradiated under scanned electron beam to extend storage life. Irradiated spuds usually keep 18 months (instead of just 4) before sprouting.

POINTERS ON CONTROLLING

Researchers put spotlight on physical, chemical, and biological checks needed both during and after treatments . . . Detail strong efforts being pressed to achieve commercial electron-beam units for delivering rays in regulated, "just right" amounts

GEORGE E. DANALD and DANIEL F. FARKAS

Respectively, Nuclear Effects Engineering and Research Coordinator, Quartermaster Food & Container Institute for the Armed Forces, Quartermaster Research & Development Command, Chicago

THERE'S NO DOUBT that many foodstuffs can be preserved by irradiation. It has been shown countless times by laboratory experiments.

However, commercial use of this new means of food processing presents challenging problems. Among them are the questions of adequacy of equipment and control of the radiation "dose."

At present, no machines are available which can irradiate, under typical production-line conditions, the tonnage quantities of foodstuffs required for commercial distribution, to provide products having guaranteed wholesomeness paralleling that of the frozen, dehydrated, and thermally processed items.

In the foreseeable future, electrons generated in large machines stand as candidates for the job of food-irradiation preservation since, under commercial operation, many thousands of watts of high energy electrons are required.

Preservation of foods by electron-beam irradiation will require careful dosimetric measurements at all stages of the operation*. For underdosage may leave pathogenic bacteria in the food. And excessive radiation may damage its flavor, color, and texture.

When a machine and product and package combinations are decided upon the requisite parameters that call for measurement and/or control must be enumerated.

For the machine these are–

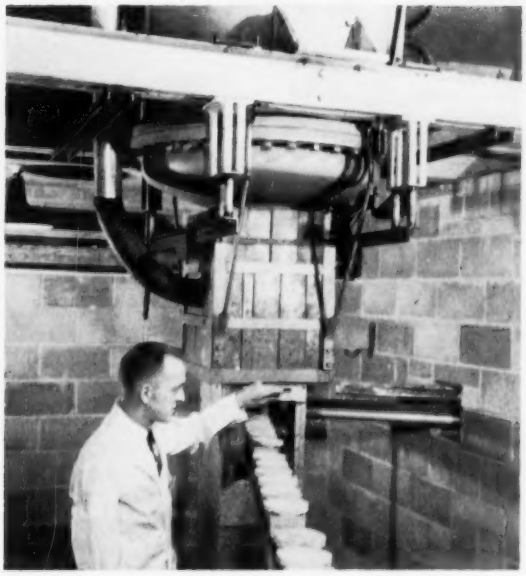
1. **Beam energy, current, area, and scanning.**
2. **Energy distribution over beam area.**
3. **Pulse size and shape (for pulsed machine).**
4. **Duty cycle.**
5. **Operation duration, if not continuous.**

For the package–

1. **Dose distribution over package surface and throughout package depth.**
2. **Quality-control dose indicator.**
3. **Variation of size and shape, from package to package.**

*The field of food irradiation by Gamma and X-rays is not considered here.

'Ray' Potatoes, Meat, Fruit



GE RESONANT TRANSFORMER is being employed experimentally in Swift & Co. plant to study effects of irradiation on meat patties.

LINEAR ACCELERATOR (Applied Radiation Corp.) uniformly irradiates lemons as they roll under beam emitted from horn between two scanning magnets.

DOSAGE IN FOOD IRRADIATION

Each of the above factors must be explored and finally pinpointed during phases of machine operation. First come acceptability tests to compare performance of the machine with specifications established for its construction. Then we have to determine the instrument's ability to irradiate food satisfactorily in long-period operation.

Acceptability testing will encompass both the machine and the package to be irradiated, because each type of package will require performing the irradiation job somewhat differently. Factors such as package size, shape, or density will call for variations in beam energies, beam currents, or dose rates. This is analogous to requirements in thermal processing for various size containers, as No. 2 or No. 10 cans.

These tests must be designed for careful determination of all the variables cited above for both machine and package. To accomplish this, physical, chemical, and biological measurement techniques will be required. Our Tables I and II summarize the suggested and projected methods for acceptance-testing of the electron machine (tables on p. 62).

When the machine has been proved as a production tool, the operation on a food-production line can begin. This operation will be based on physical values derived from acceptance testing. A set of values will be distinguished for each product to be irradiated. Machine controls will be of the "set-to-operate" type for each item processed.

There will be application of the limits within which each control may vary. When any variable exceeds the predetermined limits, or a combination of factors adds algebraically enough radiation to carry the total result (actual dose delivered at any instant) beyond the limits, then an alarm would sound, or the package in question would automatically be marked or rejected from the line.

Measuring Dosage

Simultaneously with the machine's own control and monitoring devices, but independent of them, a separate measurement of dose delivered to the food must be made. This dosimetric measurement may involve physical or chemical techniques, and it must be highly accurate.

Frequent, precise measurements would be necessary at start-up. As experience is gained, they can be made less often and, when operation has become routine and firmly established, infrequently.

For a number of months after initiation of operations, however, a quality control dosimeter–a "go, no-go" device–probably should accompany each food package that is irradiated. It's possible that this practice should be continued indefinitely or even permanently.

Just as the thermometer now controls thermal processing, the dosimeter will control radiation processing of foods. Dosimetric systems which are candidates for the two types of measurement (the precise and the "go, no-go") follow:

Precise

1. **Cobalt, silver-activated phos-**

phate, or a manganese-type glass.
2. Ceric sulfate, ferrous sulfate, or ferrous-cupric sulfate.
3. Ion chambers.
4. Calorimeters (heat measurement).
5. Dyed cellophane.
6. Photographic emulsions.

"Go, No-Go"
1. Chlorinated hydrocarbons.
2. Inoculated packs of standard concentration or microorganisms.
3. Colored tapes.
4. Dyed cellophane.
5. Photographic emulsions.

In general, control methods would be similar to those cited in our tables, with the addition of electronic regulating equipment to mark packages not properly dosed or to record such factors as variations in machine parameters or conveyor speed.

Mounting the Attack

Largest concentrated effort aimed at achieving the needs for commercial application of radiation processing of food is that directed by the Department of Defense and, more specifically, the Quartermaster Corps.

About 90 universities and industrial and governmental groups are cooperating in the research program centered at the Chicago Quartermaster Food & Container Institute. Further, the National Research Council has appointed an *ad hoc* Committee on High Level Dosimetry to help explore and resolve the problems confronted in this aspect of radiation processing of foods. The National Bureau of Standards is taking an active part in this field. Further, the Office of The Surgeon General of the Army is investigating the wholesomeness aspects of irradiated foods. Meantime, close contact is maintained with FDA relative to testing of the various irradiated products.

A lot has been accomplished. But much more is needed to meet the problems. The Department of the Army expects that in 1958 it will have ready at Lathrop, Calif., a radiation food-processing pilot plant. To be called the U. S. Army Ionizing Radiation Center, it will be capable of irradiating foods on a production scale.

This plant will provide opportunities for further tests of machines and dosimetric measurements, and thus it is seen speeding the commercial debut of irradiation.

Once commercial applications are successfully resolved, new food products carrying special advantages may be presented for the use of both military and public consumers.

The above article reports research undertaken by the Quartermaster Food & Container Institute for the Armed Forces. Designated by the Institute as No. 704 in its series, the original paper was approved for publication with the note that the views or conclusions are those of the authors and are not to be construed as necessarily reflecting endorsement of the Department of Defense. —End

Parameters and Possible Means of Measuring Them

TABLE 1—MACHINE PARAMETERS

Electron Energy (mev.)
1. Physical measurements on machine from power components.
2. Chemical changes caused by beam in water-like material.
3. Location of dosimeters throughout sample mass.
4. Physical dosimeters located at various depths in sample material.
5. Activation threshold measurements on specific materials.

Beam Currents (milliamp.)
1. Physical measurements from power components.
2. Faraday cage.
3. Calorimetric measurements.
4. Amount of activation included in specific materials.

Beam Area
1. Chemical changes in thin materials. (e.g., photographic materials, dyed materials, sheets of special glass).
2. Faraday cage of various geometries.
3. Probe-type ion chambers.
4. Grid-type ion chambers.

Beam Spectrum (purity)
1. "Electron spectrograph."
2. "Depth-dose" measurements.
3. Physical dosimeters at various depths in sample material.

Pulse Characteristics
1. Physical observations (such as oscilloscope).
2. Monopulse dosimetry (e.g., strip of print-out paper moved at high velocity).
3. Manual pulsing of machine.

Reliability Prediction
1. Scan limit detections—Faraday cages.
2. Chemical changes in sheet dosimeters.
3. Physical measurements.

TABLE 2—PACKAGE PARAMETERS

Dose Distribution Over Package Surface
1. Chemical sheet or thin-material dosimeters.
2. Physical "feeler" dosimeter or grid system.
3. Chemical paints and inks.

Dose Distribution in Depth
1. Gel and dye systems.
2. Location of dosimeters in typical mock-up package.
3. "Layer" dosimetry.
4. Inoculated "layer" packs.

Micro Dose Distribution (1 micron^3)
1. Inoculated packs.
2. Micro dosimetry (e.g., using glass needles).
3. Calculation of machine dose or throughout.
4. Calorimetry.

"Go, No-Go"
1. "Go, No-Go" dosimeter.
2. Elevated storage to cause incubation.
3. Quality control tests.

Macro Dose Distribution
1. Whole package dosimeters.
2. Inoculated packs on large scale.

IMPROVED 3-LB. HAMS go into cans. Technique is marked by greater care in trimming, special curing, and drying, plus tight control through pressure-retorting stage.

Boost Your Food's Keeping Quality—And Everybody Wins

Packer does it with that extra bit of attention to processing and control. Result: Sterile canned hams of twice the old poundage but only half the shrinkage—scorch-free meat that's tops in taste and no problem to slice

HOUSEWIFE easily slices the new better-textured canned ham. She buys it as a stable item she can store on any shelf—no need to crowd her refrigerator with it.

FE STAFF

MAKE YOUR PRODUCT less perishable and you gain immediate important benefits—not only for yourself but also for shippers, distributors, retailers, and consumers.

Sometimes it only takes better preparation of your raw materials backed by closer process control.

A product demonstrating these principles is the new 3-lb. *sterile* canned ham introduced by The P. Brennan Co., Chicago.

This attractive item saves on refrigeration in warehousing, shipping, and retailing. It can be stacked for effective mass display in stores. And the housewife can keep it on her cupboard shelf as very convenient "stand-by" fare. She need not crowd her over-taxed refrigerator with it.

Way It's Accomplished

A key procedure in the production of these hams is removal of fat from both external and internal portions of the cuts. Involved, too, are careful control in curing (with sweet pickle), drying of the cured meat, and boning. Then the canned ham is thermally processed (in a pressure retort) to a controlled temperature sufficient to check spoilage.

Sterile canned hams have, of course, been available for some time in the 1½-lb. size (shrink losses around 33%). Until now, however, attempts to "sterile-can" larger sizes have proved unsuccessful.

With the amount of retort-cooking needed, surface of these larger hams tended to over-cook and scorch.

Hence, these hams tasted more like corned beef, and the meat's texture was extremely soft and thus difficult for the housewife to slice satisfactorily.

Weight Up, Shrinkage Down

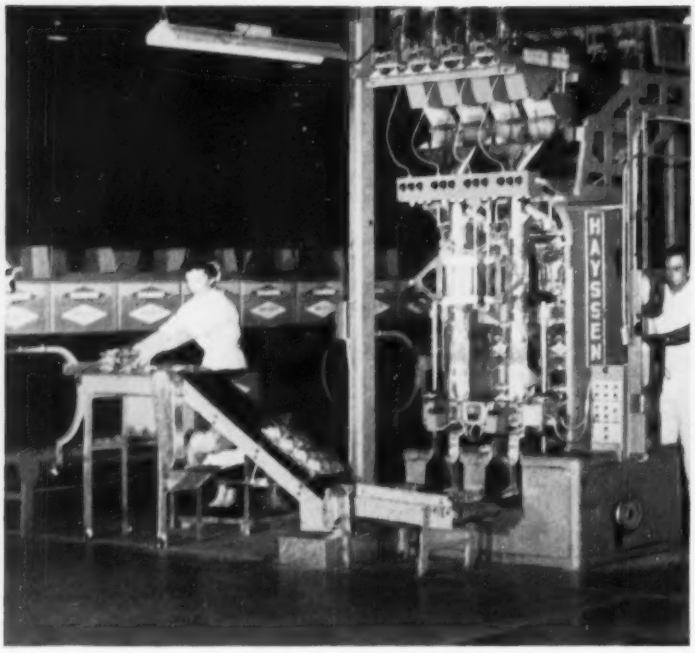
Now, however, Brennan's president, Robert C. Munnecke, reports eminent success in sterilizing 3-lb. canned hams—and with an average shrinkage loss that is running less than 17%.

This product has a fine flavor similar to baked ham, and it can be readily sliced without the meat falling apart.

J. H. Bryce, General Manager
"It was a matter of dollars and cents to our growers"

A. L. Buffington, Prod. Mgr.
"This plant will pay for itself in five years"

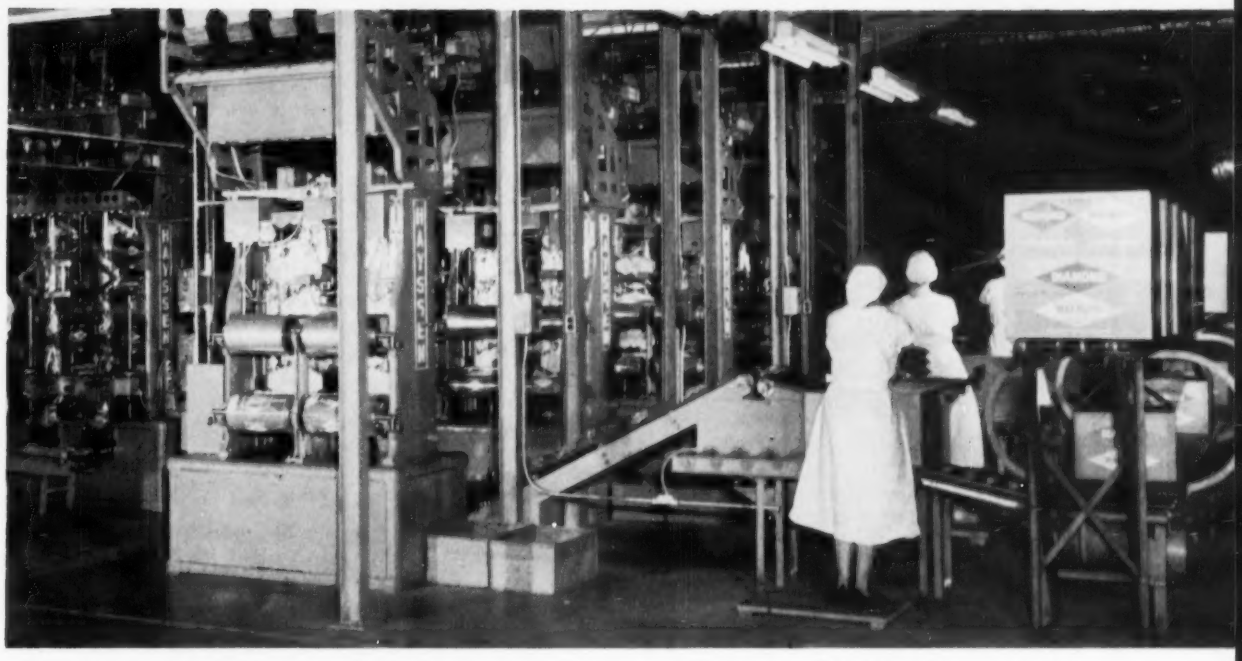
William Libbey, Engineer
"With us, engineering is a never-ending task"



THREE BANKS of high-speed

Master Planning

Its plants outgrown, young management touches off exacting engineering studies that lead to a giant new structure. It incorporates latest materials handling, refrigerating, and processing techniques—to cut labor 78%, amortize the facility in 5 years



cellophane packagers turn out bagged, in-the-shell walnuts at the rate of 1,100,000 packages per day.

Conquers Expansion Emergency

A. L. BUFFINGTON and C. R. HAVIGHORST

Production manager, Diamond Walnut Growers, Inc.; and Senior Associate Editor, "Food Engineering"

YOUR OPERATIONAL FUTURE can hang in the balance when you find your facilities outgrown. It's a situation that demands all-embracing decisions. Halfway measures can throw you.

In the case of Diamond Walnut Growers, Inc., this problem had eclipsed every other consideration. By 1954, it had literally outgrown all four of its plants, located in industrial Los Angeles.

Complicating matters was the fact that the plants weren't centrally situated in the walnut growing regions. There were, moreover, myriad other handling disadvantages in operating both single and multi-floor—and widely separated—plants in this high-cost, congested area.

Getting it "On the Road"

Diamond's need for a radical change was challengingly complex. To dispose of four factories and construct a new one having double the combined capacity of the others was a distinctly high-cost proposition that merited rigorous attention.

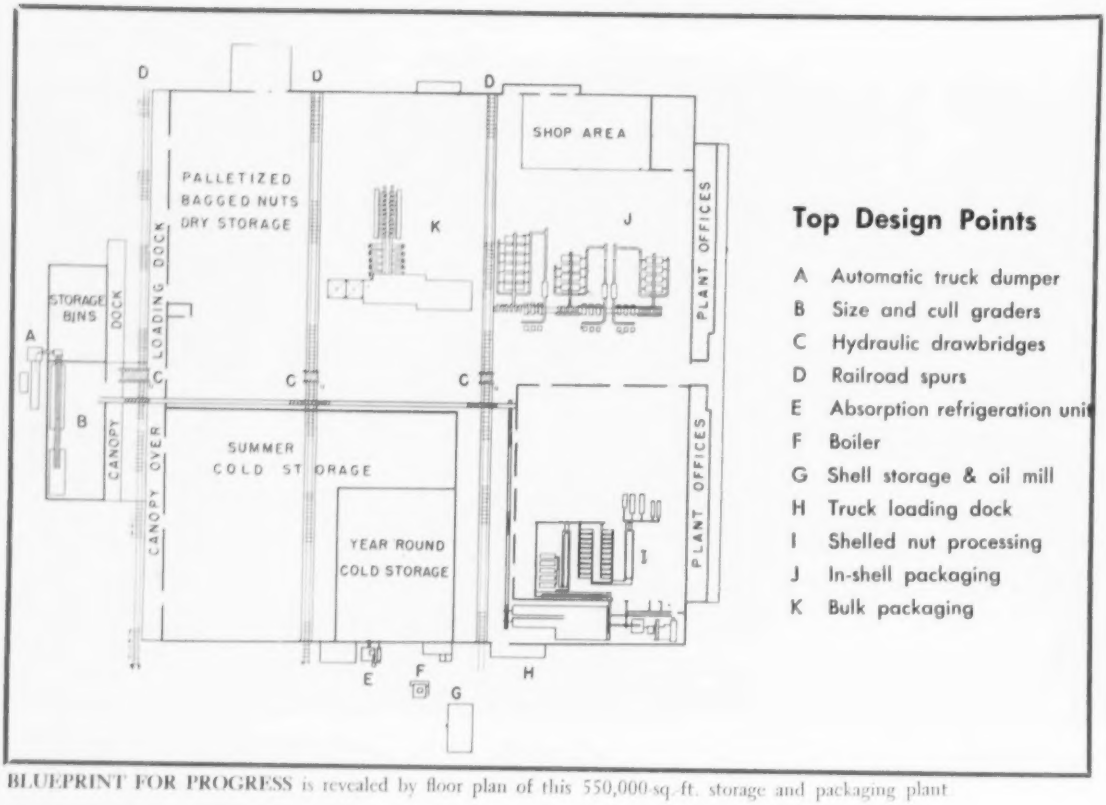
James H. Bryce, then the new general manager, started from scratch to build and equip the brand new facility that was needed. And management directly had to grapple with a multi-step program. Foremost came selection of the most suitable site, along with drafting of the unique structural specifications required for the plant.

Then came intricacies revolving around improvement of materials handling, new efficiencies and economies in packaging, design for most favorable heat balance, tighter concepts of quality control, and finally pertinent consideration of byproduct processes to recover nut meats and turn shell wastes into profit.

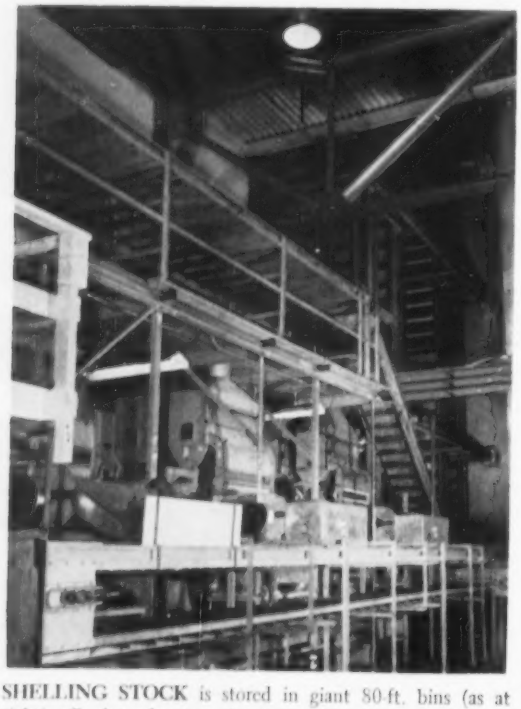
We shall detail each of these projects in turn. First, though, a word about Bryce's approach:

Initially, he enlisted the best available consultants and industrial experts in the field—to assure the most modern attack. Scientific methods then revealed Stockton, Calif., as the requisite site, and they further blueprinted the designs and equipment for the structure and process.

Included with this report is a 4-page foldout flowsheet (see p. 120) that points up process line innovations in detailed plan and elevation views.



BLUEPRINT FOR PROGRESS is revealed by floor plan of this 550,000-sq.-ft. storage and packaging plant



SHELLING STOCK is stored in giant 80-ft. bins (as at right). Bucket elevators (background) move nuts to cull graders (left), then pass them to the cracking department.

In the hands of experts, a program is doubly insured. The new $8,000,000-plus plant was quick to produce results, with these two major achievements cited immediately following last year's shakedown operation:

Whereas preliminary estimates (based on known requirements for the four old plants) had set peak labor needs at 3,000 workers, the new methods, machines, and plant reduced this figure to 650—a saving of fully 78%!

And so skillfully contrived is the plant's efficiency that operational savings alone are expected to pay for the new facility within 5 years!

Selection of Plant Site

Stockton was picked as the location for the 50-acre property because of a combination of advantages. Those exerting the strongest influence were:

• Stockton is nearest city, of those studied, to the center of the walnut producing area. About half the total acreage and half of the member-owned packing houses are located within a radius of 100 miles. Stockton is ideally served by all transport facilities to speed raw materials from grower to plant.

• During a normal season, Diamond ships 1,700 rail-cars of walnuts to the nation's markets. Three main transcontinental railroads as well as two local lines con-

verge at this central California community. Each of these has a large marshalling yard to supply cars—the Santa Fe's being directly adjacent to the plant. The city is in the center of the State at the hub of major and minor highways, an ideal location for truck service. And ocean-going vessels dock on the river at the Port of Stockton, making water shipment available if desired.

- The available labor force is large. And plenty of water (4,000 gpm.) is provided by the city.
- The type and quantity of housing available to company employees, migrating from Los Angeles, met expected needs.
- Finally, the assistance provided by county and city authorities, the chamber of commerce, and other civic groups, was the best of any location under consideration.

Unique Building "Specs"

Tilt-up, reinforced concrete walls and a steel, glass-wool-insulated roof were picked to house the 550,000 sq. ft. of level floor area. Storage bays measure 80x60 ft., with a clear stacking-height of 20 ft. from floor to steel roof trusses.

A 6-in. reinforced concrete floor is supported by a compacted-earth fill. It is placed at rail-car floor level to facilitate loading and unloading.

Four rail spurs penetrate the entire width of the plant, and two additional spurs are at the rear of the structure. A truck shipping-receiving dock accommodates 10 trailer trucks.

There are two refrigerated areas, insulated with 3½-in. glass-wool anchored blocks. One of the cold storage areas is built within the other. Walls are protected from fork truck damage with 8 ft. of reinforced, insulated concrete. Above this point construction consists of steel studs and insulating board.

The smaller, inside cold-storage area is in constant use—with temperature maintained at 34F. (and 60% RH). The larger area is used during summer months to protect product quality from the heat.

Walls in the nut meat processing area are of hard, washable plaster, in conformation with the sanitary code. Other plant walls are of hollow concrete blocks or brick for fire protection.

Improved Materials Handling

Some 60-65% of Diamond's annual total walnut receipts of more than 1 million bags (100-lb. size) are destined for in-shell packaging. This was the most costly operation in the old plants. Thus, it was a major engineering problem in new plant design.

Therefore, a detailed study was made of handling methods. And here are some of the major results:

Fork-Truck Operation

All goods—both bagged and cased—are now palletized for fork-truck handling. The floor of the 13-acre plant, specially designed for this handling method, is entirely level. There are no inclines or ramps that trucks need to negotiate at low speeds for fear of toppling loads.

Hydraulically operated drawbridges, opened only when rail cars are moved into the plant, span the four inside and two outside spur tracks.

Pre-Processing Speeds Handling

Unlike most other food companies, Diamond receives its raw material already quality graded. And with the exception of subsequent grading for shelled kernels, the major unit operations comprise handling and packaging of in-shell nuts.

This is a cooperative, and the grower members are well aware of the economies derived from pre-processing walnuts at their own packing houses. The operation consists of hulling, dehydrating shells, vacuum grading, bleaching in a 2% sodium hypochlorite solution, drying, size-grading, and a final vacuum grading before packing the nuts in 100-lb. bags.

The heavy, green hull usually splits and separates from nuts during the harvest, which is a semi-mechanical operation.

The vacuum graders—suction devices—remove blanks, defective nuts, shells, and other extraneous matter. Bleaching and drying give shells a uniform light color. Size-grading separates nuts into large, medium, and baby sizes.

Each of these three sizes is then further separated by fine vacuum graders.

Large, medium, and baby nuts of "merchantable" grade are bagged and shipped to the plant for in-shell packaging. Both the very small nuts and those that are split (totalling about 17-20% of crop) are shipped in bulk to be used as shelling-stock.

Each spur is 700 ft. long. This extensive trackage reduces fork-truck travel distances and makes it possible to handle up to 75 rail-cars daily.

Docks (25 ft. wide) on either side of the tracks give access to the cars. And there are no interfering columns to restrict fork-truck movement. Wide aisles throughout the plant, designated by painted lines, govern traffic with full safety.

Access doors to refrigerated areas are to be radio-controlled by fork-truck operators. Larger doors, permitting rail car movement through the area, are actually demountable, insulated partitions, and are designed for easy handling with fork-trucks. When room is not refrigerated, the out-plant exit is closed by a roll-up door.

Despite the fact that this plant is only one year old, the management is already considering plans to change from the present practice of handling in-shell nuts in bags to a bulk handling system. When in effect, this new handling method would employ truck or rail-car bulk transport and in-plant conveyor systems to replace lift-trucks. It also would obviate the costly handling and maintenance of literally millions of burlap bags.

Conveyors for Shelling-Stock

The newly designed, rather complex conveyor system for handling shelling-stock is far superior to the methods used before. It is entirely mechanized, and, while specific data isn't currently available, it is known that this new technique has achieved considerable reduction in labor, a significant increase in rate of handling, and provided means for far better quality control.

Here, stock is received in bulk by rail-car or truck. Rail shipments are scooped from cars onto conveyors which feed into elevators supplying the storage bins.

——Begins on page 64

Truck deliveries are weighed, then entire loads are dumped into a hopper from which the nuts are moved to storage bins. Here, there is provision for size grading nuts, if necessary.

Stock is conveyed from storage to shelling department by two overhead, connected conveyors (850 ft. total length). These are 24-in. impregnated-cotton transmission belts.

After cracking, nuts are further conveyed to air-separators, where meats are sorted from shell and fiber. By bucket elevator and conveyor systems, meats are moved to electronic color graders, manual inspection tables, and the station for final packaging in tins or in bulk cartons—with intermediate stops at special bins.

This system replaces the old handling of product in galvanized-metal boxes that were moved on hand-trucks in slow freight elevators.

Packaging Costs Cut

There was bold scrapping of obsolete packaging machines and methods, with $500,000 invested in new units that can handle 1,100,000 cellophane bags of walnuts (1-lb. size) per two-shift day.

As a direct result, labor requirements for this department were slashed 75%. Former thinking was that many of the machines required by Diamond had to be specially designed and built, since no machinery manufacturer had at that time applied equipment specifically to walnuts.

But the company's new group of young engineers saw no reason for investing in the design and fabrication of any machines that could be bought. True, some of these would have to be adapted to their needs, but this course is usually far more economical than the do-it-yourself method.

Now, 28 machines (Hayssen) are arranged in three independent banks (8, 8, and 12). Thus, at the start or end of a season, when there is less stock for packaging, only those machines actually required to handle the minimum load need be operated which chalks up savings in cleanup time.

In action, branded in-shell nuts are discharged by overhead conveyor into hoppers, located over the packagers. Each unit has four scales, each equipped with four-section paddle-buckets. Product is fed from the hopper into a bucket-section by bulk and dribble vibrator-feed systems.

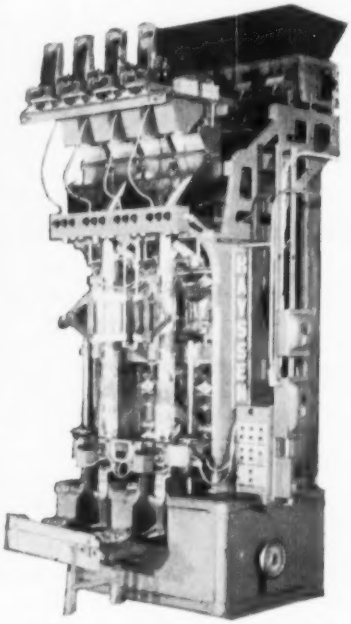
When the exact pre-set weight is attained, the feed-in stops, a solenoid trip releases the paddle-bucket, and product chutes through one of the two bag-forming mandrels into the cellophane bag.

Two sheets of No. 300 MST roll stock (one printed with trade-name) are formed into a tube over the mandrels. This tube is sealed with ½-in. seam at the bottom, which is then cut in half to form top of the filled bag and bottom of the next package. Rate: 45-50 bags per min.

Packaged walnuts are hand-packed in cases, and these are conveyed to the case-gluer and compression units and thence to the palletizing station.

Burlap bag fillers (100 lb.) are served by an identical system of blenders and branders. Nuts are elevated to hoppers, from which they are discharged into bags which rest upon scales for accurate weighing. Bag-tops

RUBBER ENGRAVINGS, inked by rollers, brand nuts for in-shell packaging. Product passes under platen in a special, pocketed conveyor that rotates around sprockets and discharges product to packagers.



ROLL-STOCK cellophane is formed into tubes, and filled with carefully weighed charge from scales.

SHORT ROUTE TO STRAIGHT ANSWERS

NEW Dow booklet on propylene glycol, U.S.P., covers uses, specifications, properties in 32 fact-packed pages

Here's helpful data on propylene glycol, U.S.P.—a material that offers this combination of properties: odorless, practically tasteless, low in volatility; serves as an emulsifier, solvent, wetting agent, humectant, plasticizer, preservative. For your free copy of new booklet, "Propylene Glycol, U.S.P.", mail coupon today.

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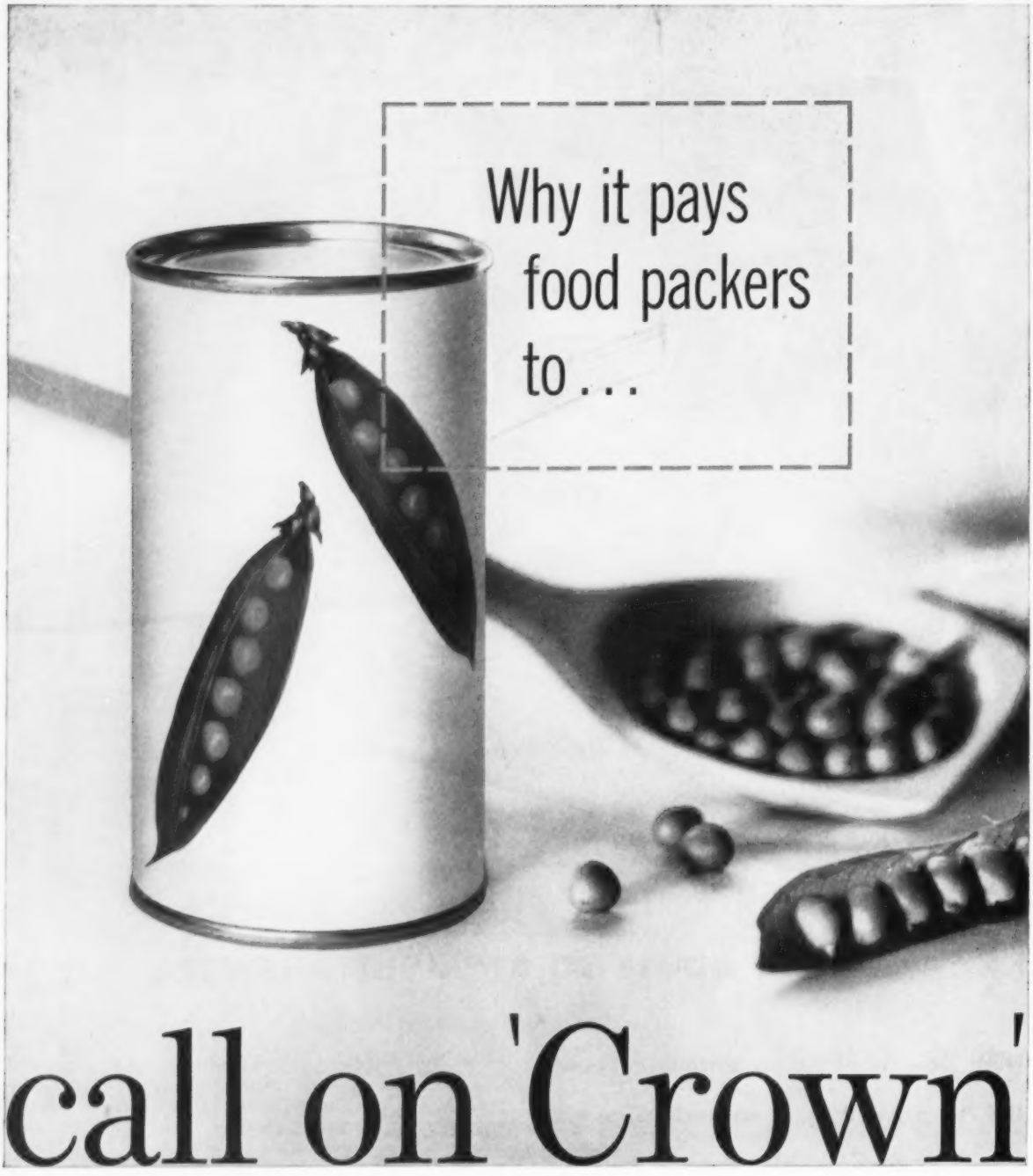


Speed of manufacture, quality and dependability of supplies and service during peak seasons are *essential* to every food packing operation.

Crown offers all this *and more* – including technical help at the customer's plant during emergencies, the built-in economies of the fast operating Angelus closing machine, important help in adapting the most advanced methods of can packing and handling to existing operations . . . sparkling lithography that adds sales appeal at the point-of-sale.

Crown's broad experience in *all* phases of packaging – in bottle crowns and closures for glass containers . . . in machinery for filling and closing cans and glass jars . . . in pressure packaging – combine to provide "one company responsibility" that pays real dividends when you . . . *call on Crown.*

CROWN CORK & SEAL COMPANY, INC., PHILADELPHIA 36, PENNA.

COMPANY-DESIGNED can filler operates on two-step cycle: Containers are first bulk filled (right), then topped off on scale platforms from accurate dribble-feeders (left).

are sewn by machine, product is palletized, then moved to the accumulation center for truck or rail car shipment.

Diamond's Can Filler

Two vacuum packagers had to be designed by company engineers—special can fillers with capacities of 7,000 cans/hr. and filling tolerances of ±⅛ oz. Here, a dual filling method is employed: First volumetric, then dribble for accurate weight. And each unit is actually two fillers in one, since each has duplicate filling mechanisms. Can feed is divided at the entry to the machine, to serve both sides, then re-combined at the discharge end.

This inclosed volumetric unit has a set of four reciprocating pockets, open at top and bottom. These move across a base plate under the feed hopper for filling, then reverse direction and slide to the other end of the plate, where meats are discharged into four hoppers, under which cans are automatically positioned. Size of these pockets is slightly less than that of the can volume.

Next, cans are automatically pushed onto scales by a reciprocating bar, four at a time. Vibrating dribble chutes, actuated by scale-balances, now complete the accurate fill. When weight is met, balances actuate the reciprocating bar, and filled cans are moved from scale balances to discharge conveyor.

FE Special Plant Report

——Begins on page 64

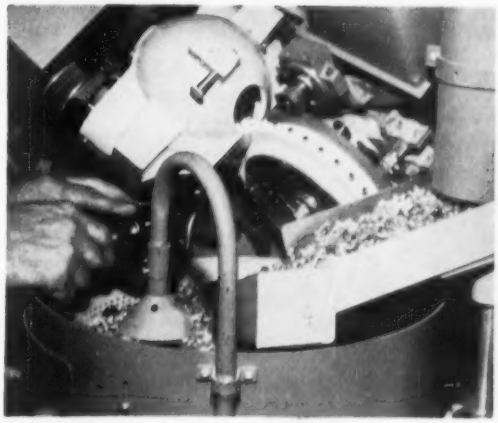


PHOTO-EYE GRADERS separate kernels by color, and are adjusted for a very narrow range. Acceptable nuts pass through, rejected meats are blown from disk by a puff of air.

Bulk nut meats are filled into 25- and 30-lb. wax-paper-lined, corrugated cases. Both canned and bulk cases are palletized and trucked to the accumulation center for shipment or are stored under refrigeration.

Design for Heat Balance

A major problem was posed—getting economical and efficient refrigeration for the 2,400,000-cu.-ft. storage area (a space equal to a modest public warehouse), 25 bulk bins filled with walnuts (34F.), a cellophane stor-

—Begins on page 64

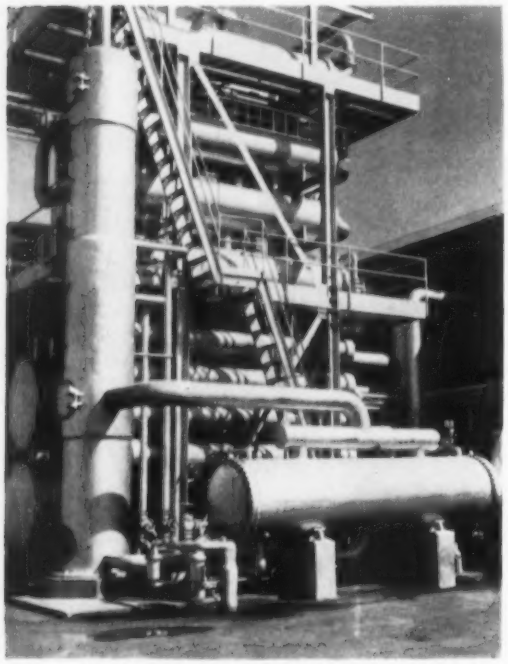
age room (60F.), and plant air-conditioning. Here's how Diamond's engineers and their consultants solved it:

Next to edible walnut meats, the major output at this plant is some 85,000 lb. of shell (per 8 hr. day). It has a calorific value of 7,850 Btu., moisture content of 8%, and ash content of .05%. Further, the material is easily handled by air conveyor and makes an ideal boiler fuel. If steam could be used as the primary energy, the engineers reasoned, fuel savings using the shell would hit $9,000 annually.

Since much equipment would require steam (the Armstrong process, oil mill, and plant heating system), they conducted two major heat balance studies to pinpoint feasibility of the idea.

The first analysis considered using steam turbines to drive refrigeration compressors and all auxiliary power units over 30 hp. In this study the cold storage area was to be refrigerated by an ammonia system, the air-conditioning by a centrifugal water-cooler chilled by Freon 11. Here, the turbines would require a condensing system to keep steam consumption in balance with the fuel supply.

The second analysis was made on the basis of using a common ammonia-absorption system instead of mechanical refrigeration compressors. Steam turbine power was still planned to drive large fans and pumps. This design combined air-conditioning and refrigeration requirements into one system and carried both at a common suction pressure determined by the needs of the cold storage section.



ABSORPTION REFRIGERATION system utilizes exhaust steam from plant process equipment. The unit, designed with 100% safety factor, turns out 1,300 tons refrigeration.

This setup eliminated the need for a steam condensing system, since the absorption unit's generator would utilize and condense exhaust steam from the auxiliary turbines used to drive fans and pumps.

Comparison revealed that the absorption system required less capital investment than an equivalent compression system, would directly use available steam (since a thermo-cycle system provides refrigeration by use of heat), would be cheaper to maintain, and could be installed outdoors.

Largely upon these economic and operating aspects, the heat-balance system was designed around a York Thermo-Cycle setup.

Few plants, if any, use refrigeration systems of this type. In fact, this is the only one operating in a food plant on the West Coast. Use here, of course, was determined by refrigeration requirements and availability of steam and water at the plant.

Where requirements are above 150-tons refrigeration (and certainly at 300 tons) an investment cost analysis —including operating, installation, and maintenance costs, taxes, and insurance—can show that this system has definite advantages over a compression system.

At Diamond, the cooling tower is designed to maintain proper water temperature for a 1,300-ton refrigeration system, providing a 100% safety factor.

Steam System

The 1,000-hp. boiler utilizes 2 tons per hr. of shell (winter season load) and develops 17,000 lb. per hr. steam-flow at 250 psi. (556F.). Total capacity is 40,000 lb./hr. In case of shell shortages, a standby gas-fired system is actuated.

Superheated steam is piped through the plant to ten steam turbines (total 638.5 hp.) which drive fans and pumps. The exhaust from these units (14 psi.) is then utilized by the absorption unit, and plant heating and processing equipment. A make-up valve provides additional steam at 250 psi. for the absorption unit. In this closed system, almost all of the steam is recovered and condensed for boiler feed-water.

Average exhaust steam requirement for the absorption system is 25 lb. per ton per hr. Pressure required is variable, from 1 to 15 lb., depending on the quantity and temperature of condensing water and the desired evaporator pressure.

Electrical Power

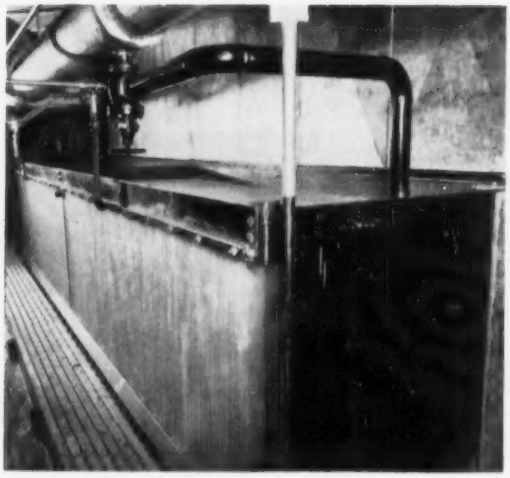
A savings of 4% on electrical power was achieved by installing company-owned transformers for the 12,000 v. supply that handles 3,000 hp. of connected load. This power is reduced to usable voltage at four load centers.

Brine Air-Coolers

Refrigerated storage areas are maintained at 34F. with wet-plate direct brine-to-air transfer units of recognized design. Not broadly used, these coolers are served with 7,000 gal. of calcium chloride brine from the absorption refrigeration system.

There are a total of 16 units, with 4 in the year-around storage room, 8 in the main storage, and 4 in the bulk storage bins. Motor-powered axial-flow fans are used for air distribution. In the year-around room, two 15-hp. fans deliver 200,000 cfm., and in the bulk storage system two 25-hp. fans turn up 240,000 cfm. of refrigerated air.

——Begins on page 64



DIRECT BRINE-TO-AIR cooler gives unique control over both temperature and R.H. in the vast storage areas. From receiver (top), brine flows down over double-ribbed glass panels, and discharges into covered gutter (bottom).

Fans discharge air into a perforated duct-system (84-in. dia.) designed to jet air over all the stored product. Other ducts, located around the walls with perforations facing the walls, act as the air return.

In the brine-air units, the amount of brine released from the receiving pan to flow down the 152 specially built corrugated-glass panes is controlled by "valves" of a unique type. At the top and in each interstice between the panes, a rubber tube ($\frac{3}{8}$-in. o.d.) is fitted over a $\frac{3}{8}$-in. rod.

The latter is fastened to each side of the frame. Wedged between the 21/32-in. space between the glass panes (about 2 in. down from top of panes), these tubes and the top edges of the panes essentially form the floor of this pan. The terminals of each tube are fitted with metal ferrules to hold these orifices open. A header on the front side of the unit connects to all tubes and supplies them with brine (5-10 psi.) or vacuum (15 in.). A second, dead-end header, at the back of the unit, forms a reservoir chamber.

From the main control panel, the engineer can regulate storage room temperature and humidity merely by adjusting the brine temperature or its concentration. A heavier or lighter flow of brine is attained by regulating the pressure in the tubes to expand or contract their normal diameter. By applying vacuum and partially collapsing the tubes, brine flow acts as a flushing medium to clean the glass panes.

During winter months, brine temperature is maintained at 23F. (18.3 Baume), and during summer at 12F. (21-22 Baume). To eliminate moisture pickup and to concentrate to desired Baume, brine is heated by steam coils to 212F. in two 1,500-gal. tanks.

Air Conditioning

All air entering the refrigerating and air-conditioning systems is first washed and filtered to remove dust and prevent product contamination.

Two fans, each powered by a 75-hp. turbine, provide warm or cool air to the air-conditioning ducts. Located in a fan loft atop the main building, these units deliver 140,000 cfm. of air through steam coils for plant heating. A capillary air washer, chilled with cold water (32F.) from the absorption system, handles cooling demands.

Quality Control Consciousness

In keeping with management's progressive plans, there is a fully equipped, properly staffed laboratory for quality control and product research.

But quality control actually begins in the field, where a crew of 21 inspectors sees that every lot of walnuts is checked before shipment to the plant. Main concern is to evaluate the percent of sound, edible, light-colored kernels.

To do this, field men first take sample nuts from the lot, crack them, and grade the kernels, counting the number of blanks, splits, and defective nuts. Air flow in the vacuum air-separator is determined from this figure, and is set to "scalp" the culls from the sound nuts.

Having removed culls, the lot is then graded into three sizes (large, medium, and baby), which are stored separately. Each of these fractions is graded for quality and tagged for in-plant identification. The grower is paid on the basis of this last quality evaluation.

At the main plant, the lab takes 1-lb. samples every 3 to 4 min., from secondary storage bins as they are filled. Results of this grading determine fitness for packaging or the need for regrading in the electronic sorters.

Tests cover shell-fiber count, shrivel, mold, insect damage, rancidity, and off-color. A lot destined for the "halves and pieces" pack must have at least 20% intact halves to meet grade qualifications.

Byproduct Processes

While most shell is utilized as boiler fuel, part of it is sold for "sand blasting" uses. Also, two processing techniques recover other products.

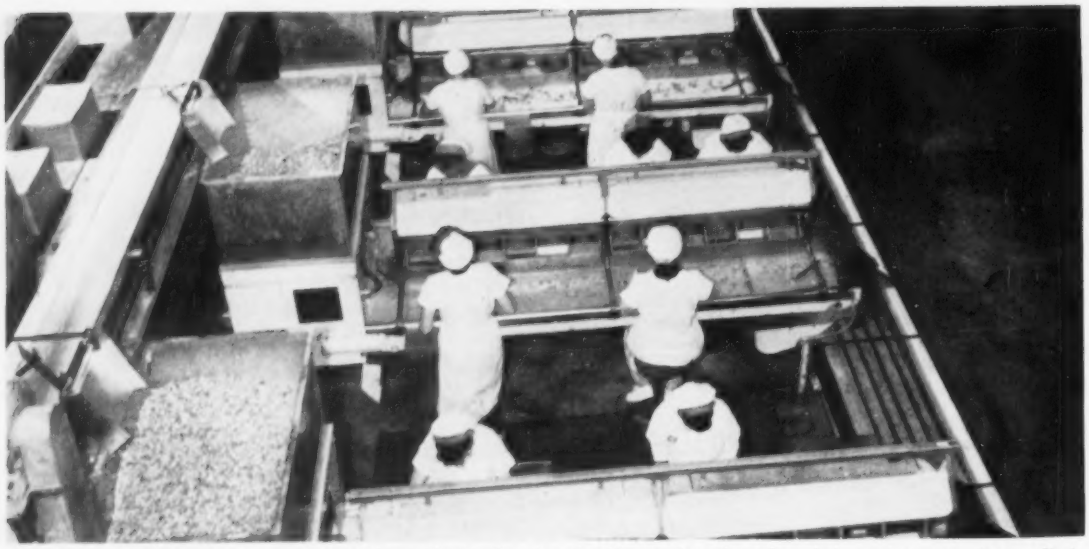
Even with efficient air separation, the shell still retains about 5% of the nut meats. Thus a wet-separation technique—the Armstrong Process—is used to recover some 4,000 lb. of these remaining good-quality edible meats per 8 hr. shift.

After air separation, the material is batched into tanks. A 28½-in. vacuum is drawn and held for 1 hr. to remove air from shell cells. Next, the vac is broken and fresh water is introduced under 5 psi. for ½ hr. to soak shells. Contents of the tank are then dropped into a flume that carries the water-logged shells to the brine-separation tank.

Here, the meats—being lighter than the water-soaked shell—are separated by flotation, spray washed in a bucket elevator, and centrifuged. Meats are then surface-dried to 4% moisture in a dehydrator and conveyed to inspection tables. This product is 99.9% shell free.

The shell is air conveyed to storage bins for further processing into byproducts.

——Begins on page 64



ONLY REMAINING hand operation in this packaging line is a visual inspection of nut kernels just prior to canning to eliminate any culls that have slipped by the color sorters.

Oil Mill for Shell

There still remains a potential ¼ to 1% nut meat in the shell. Therefore, further extraction is economically feasible. The material is moved from shell storage bins to a disk mill and shaker. The resultant meal, called "concentrate," is mixed with inedible meats (discarded from grading operations) and pressed in a French oil mill.

Walnut oil, which has rapid drying characteristics, is used by paint manufacturers. It is filtered and finally pumped into rail cars for shipment. Expeller cake, high in protein content, is ground, screened, and bagged for stock feed.

Contractors, Units, Makers

Consultants: Booz, Allen & Hamilton, 120 Montgomery St., San Francisco, management consultants; Stanford Research Institute, Stanford Village, Menlo Park, Calif., plant site study; Vandament & Darmsted, 156 Second St., San Francisco, consulting engineers. **Architect:** Benson Eschenbach, A.I.A. Richmond, Calif. **Construction:** Utah Construction Co., 2316 Central Ave., Alameda, Calif., builder; Isadore Thompson, 135 Kearny, San Francisco, structural engineer; Vandament & Darmsted, 156 Second St., San Francisco, mechanical-electrical engineers.

Equipment and Manufacturers

Absorption unit (ThermoCycle)–York Corp., Roosevelt & Thomas Sts., York, Pa.

Air washers (capillary)–American Blower Co., Tireman Ave. at Roselawn, Detroit.

Alarm systems–American District Telegraph, 156 Sixth Ave., N. Y. C.

Auto-controls–Minneapolis-Honeywell Regulator Co., 2954 Fourth Ave., S., Minneapolis

Boilers–Wm. Bros. Boiler & Mfg. Co., 1057 Tenth Ave., S.E., Minneapolis

Conveyors (shell)–Albert Air Conveyor Co., 600 Sixteenth St., Oakland, Calif.

Cooling tower–The Marley Co., 420 Market St., San Francisco

Fans (Joy Axivane)–Norman S. Wright & Co., 1015 Folsom St., San Francisco.

Fire protection–California Viking Sprinkler Co., 251 Shaw Rd., S. San Francisco.

Fork-lift trucks–Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia.

Insulation–Owens-Corning Fiberglas Corp., Toledo, Ohio.

Mechanical installations (administration building and cafeteria)–Baker Newman Co., Modesto, Calif.

Oil mill–French Oil Mill Machinery Co., 1088 Greene St., Piqua, Ohio.

Packaging machines–Hayssen Mfg. Co., 1307 St. Clair Ave., Sheboygan, Wis.

Pumps–Byron Jackson Co., 1900 East 65th St., Los Angeles; Wintroath Pumps, Inc., 224 Townsend, San Francisco.

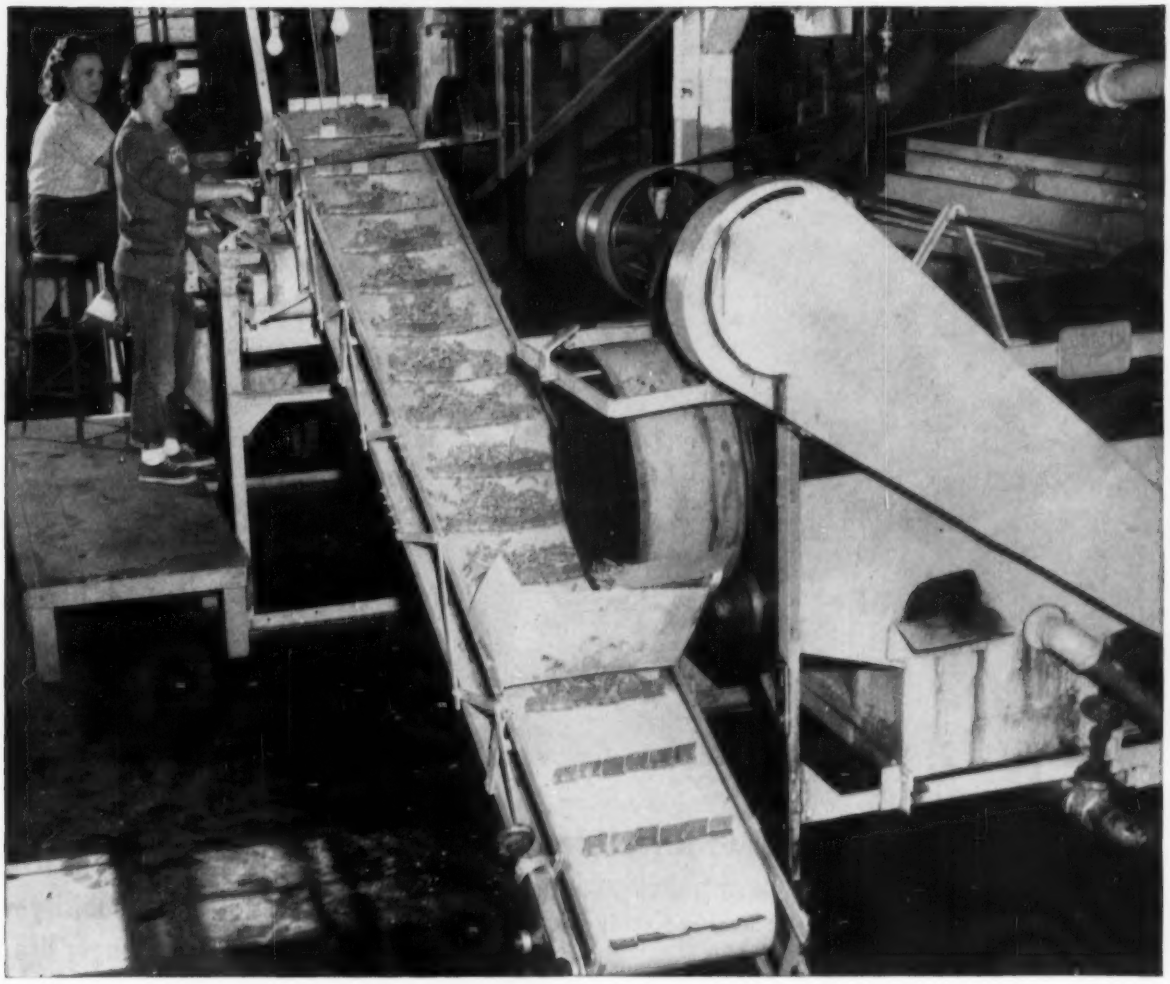
Roof decking–Granco Steel Products Co., Granite City, Ill.

Structural steel–Bethlehem Pacific Coast Steel Co., 20th & Illinois Sts., San Francisco.

Truck dumper–Kewanee Mfg. Co., Hayword St., Kewanee, Ill.

Turbines–Cooper Engineering Co., Russ Building, San Francisco; Worthington Co., 426 Worthington Ave., Harrison, N. J. —*End*

B.F.Goodrich report:



Where clean-up time was cut from one hour to 5 minutes

Problem: When a bucket conveyor was used to carry vegetables in this canning plant, cleaning and maintenance were serious problems. It took more than an hour to wash the conveyor down, and even with a steam gun it was hard to clean.

Oil couldn't be used to lubricate the conveyor, so rollers and rods carrying the buckets wore out quickly, caused costly shutdowns.

What was done: Then a B.F.Goodrich distributor suggested they try a Koroseal belt, with stainless steel cleats riveted to it. Because the belt is made with Koroseal flexible material, it resists cracking and peeling, never gets soft or sticky. And, of course, there's no danger of contamination with Koroseal—it has no odor, no taste, never gets rancid.

Savings: Since food juices can't soak into Koroseal's smooth, polished surface, this belt is a cinch to clean. In just 5 minutes this Koroseal belt is as clean and new looking as ever. The Koroseal belt had been on the job two seasons when the picture was taken, and is expected to last at least another three years. There have been no maintenance or repair costs.

Where to buy: Your B.F.Goodrich distributor has full information on the Koroseal belt described here, and he can also tell you about the complete line of belts B.F.Goodrich has developed for the food processing industry. *B.F.Goodrich Industrial Products Co., Dept. M-964, Akron 18, Ohio.*

Koroseal—T. M. Reg. U. S. Pat. Off.

B.F.Goodrich

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Furnished in sizes up to 75 hp with any make, style or type of motor; or, *without a motor if desired.* FALK Motoreducers are available from convenient factory, field or distributor stocks, from coast to coast.

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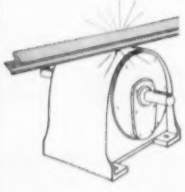
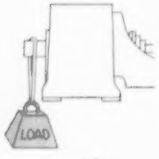


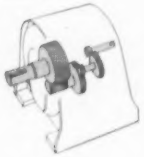
ALL-STEEL HOUSINGS

Rugged, strong, rigid ...all parts heavy steel plate, formed and welded in the Falk Weld Shop.



LARGE OVERHUNG LOAD CAPACITY

Large shafts, oversize bearings...rigid mountings with wide bearing spans to handle maximum loads.



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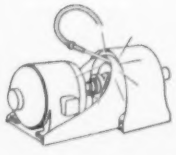
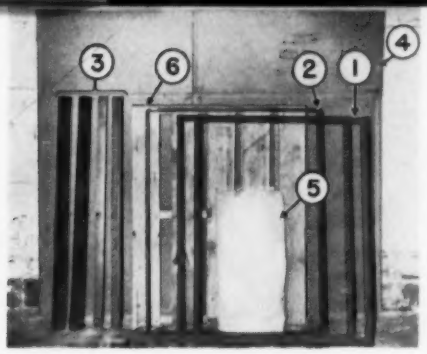
Heat-treated alloy steel gearing, precision cut and shaved after heat treatment to eliminate distortion.



SEALED HOUSINGS

Splashproof, dustproof, oiltight. Dual closures and one-way vents keep oil in, dust and moisture out.



Takes little space knocked down . . .

Unassembled bin unit includes: (1) Top and bottom angle-iron frames, (2) channel-iron center frame, (3) angle-iron corner supports, (4) corrugated container, (5) 0.004-gage polyethylene bag (folded), and (6) pallet.

. . . Goes together fast when needed

One man assembles bin (front), inserts polyethylene liner-bags (rear)—and they're ready for filling.

New Bulk Bin Cuts Handling Costs, "Stretches" Freezer Storage

Collapsibility is feature of lift-truck handled units that smooth production peaks, ease packaging loads. . . . Planned advantages are augmented by bonus values

WALTER SMITH
Quality Control, Stayton Canning Co., Stayton, Ore.

IF YOU'RE LOOKING for a way to cut operating costs—better study your materials handling picture, with a particular eye to bulk methods.

This approach has led to a new concept for interim handling of bulk frozen vegetables prior to final packaging.

The method is built around a new collaspsible bulk-bin. In turn, the bin is designed for integration into fork-truck handling, storage and, currently, short-distance shipping of bulk frozen product.

Alerted by Cost Study

The Stayton (Ore.) Canning Co. created the technique. And the methods-study that prompted the development began, several years ago, when F. M. Smith analyzed the costs of handling and storing products on pallets in 50-lb. corrugated containers.

This multiple-case method was costly in both labor and containers. It was not an efficient handling or stacking system. And frequently it led to product dehydration in storage.

The collapsible-bin solution has led to significant advantages. Leading the list is a big cut in direct labor costs—a 45% saving under the labor expense entailed in handling bulk product in the old 50-lb. containers.

Designed for Stayton's own refrigerated storage, the bins fully utilize all existing area. They are stacked 4-high, leaving only enough space for proper air circulation. They contain an average of 485 lb. of product per square foot of area, as compared with 428 lb. for the 50-lb. bulk cartons formerly used.

Using lift-trucks, there's rapid stacking and handling. And when outside storage facilities must be temporarily employed, highway trucks can be loaded to capacity. This was impossible with the multiple-case method.

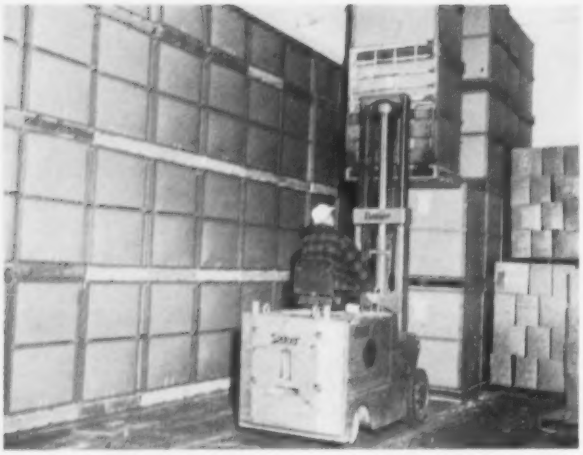
Beds of these trucks are equipped with roller conveyors, and the lift-truck operator merely pushes the first tier of double-stacked bins farther into the truck when he loads the second tier. No need for anyone to enter the truck for loading.

When unloading, the procedure is reversed. Lift-trucks may unload from either ground or dock levels with equal efficiency.

These were planned advantages resulting from the development. But there have been more benefits—some expected, others coming as surprise dividends.

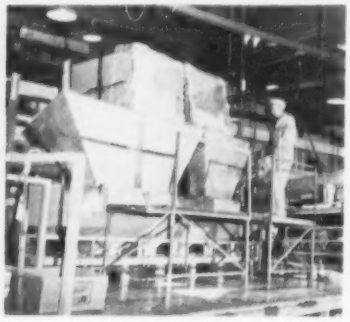
Heavy production during seasonal peaks is leveled-off by safely storing frozen products in these large containers.

Product is now drawn from storage and packaged in retail-size cartons just prior to shipment to buyer.



NEW WAY VS. OLD. Bins replace 50-lb. cartons (right) and fully utilize refrigerated storage space.

LOGISTICS of materials handling dictated bin size to permit capacity truck loads. Roller conveyors on carrier floor aid lift-truck loading.



HYDRAULIC-LIFT DUMPERS (left) complete fork-truck bin handling by pouring product (right) into blender-hoppers that serve packaging machines.

BAGS ARE WASHED on special frames, dried, then inspected for damage. Any holes found are patched after bag is dried.

This eliminates the forced-draft, round-the-clock packaging operation common in most plants. It obviates the need of large crews, overtime wages, and the handling of multiple cases in storage.

Spreading the packaging operation over the year permits better utilization of expensive packaging machinery and keeps good employees busy on a yearly basis. Investment in packaging supplies, too, is spread over the year, releasing operating capital for use during the processing season.

Reduced is the hazard of forecasting an entire season's purchase of supplies. And there is better control over inventories.

Closer quality control likewise is possible with this system. Product in each individual bin is graded and its bin number recorded. Lots are placed in storage so they may be selected as needed. Thus, certain grades may be packaged continuously without time-consuming changes in packaging machine setups, which otherwise may frequently be called for during processing due to product-grade variations.

Bin Closeup

Design dimensions of the collapsible storage bin were determined after measuring all tactical space factors (such as storage areas, doorways, and aisles) and "yardsticking" space and handling features of moving equipment (as highway transport vehicles and truck beds, lift-trucks, and hydraulic dumpers).

Stayton's bin weighs 125 lb. when empty and has a capacity of from 1,100 to 1,400 lb., depending on the product. Its inside dimensions are 39⅞ x 32⅞ x 43¾-in. depth.

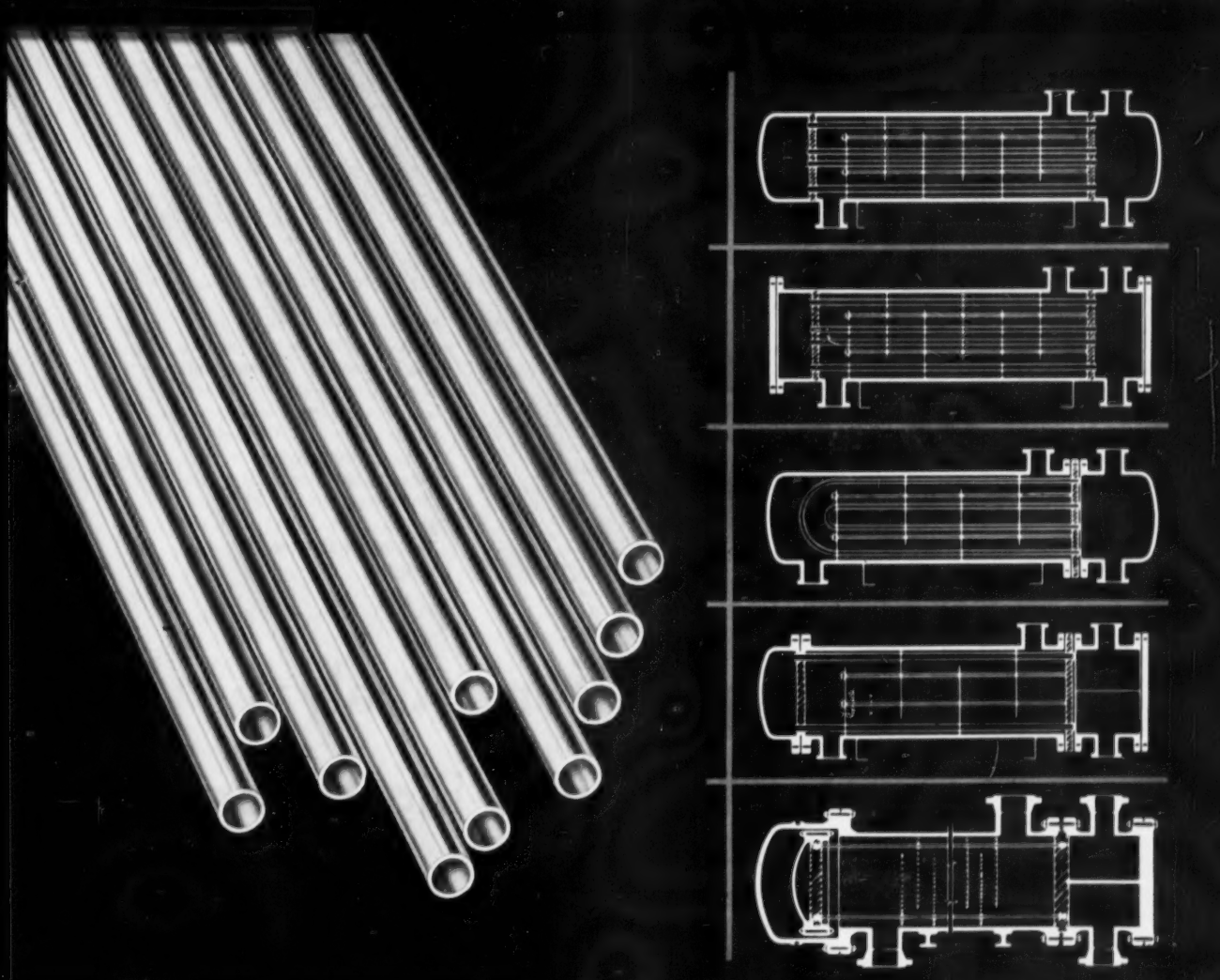
With assistance of Container Corp. of America, the proper type of required corrugated material was developed. It is a 350-lb.-test double-wall, half-slotted container with water proof adhesive.

One man can assemble a bin, ready for filling, in a few minutes. When empty, it is knocked-down and stored in a minimum of space. All parts are reusable.

The polyethylene bag (Central States Paper & Bag Co.) can be easily patched if any holes develop. As yet, no conclusive data have been developed on the useful life of the corrugated container. However, during the '56 pack, these were reused up to five times with little or no wear apparent.

In the future, these bins may be used for shipping product any distance by rail or truck. This would reduce processing, packaging, and handling costs of repacking retail and institutional items as well as mixed vegetables and soup stock.

The collapsible bins are manufactured by the Stevens Equipment Co., Salem, Ore. —*End*



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MOISTURE CHECKS—the quick way: In a half minute they'll have the accurate moisture content of the food sample being inserted into magnetic unit (right) of new NMR analyzer. Console (left) houses controls, recorder, and power supplies. Radio-frequency technique employed here holds frequency constant and varies the field strength.

NMR Moisture Analyzer Shows Big Potential

Researchers at Corn Products get excellent results with nucler magnetic resonance instrument. It gives rapid, accurate gage of moisture content of various products.

T. F. CONWAY, R. F. COHEE and R. J. SMITH
Corn Products Refining Co., Argo, Ill.

THERE'S BEEN A SPURT in emphasis on physical methods for chemical analysis within the past 10 yr.—a trend resulting from our industry's demand for rapid, non-destructive techniques.

Today, as many as five types of spectroscopy may be employed for qualitative and quantitative analyses of food materials. One of the newest—radio-frequency (r-f) spectroscopy—merits particular attention.

It has three well-defined branches—electron paramagnetic resonance, microwave, and nuclear magnetic resonance. Here we will deal with nuclear magnetic resonance (NMR), using its application to determining moisture in materials from the confectionery field to illustrate.

As an analytical tool, NMR has now been shown to offer these four significant advantages:

1. **Speed**—Time required for moisture determinations ranges 3 to 5 min. Furthermore, a projected modification of the analyzer to a "direct-reading" system will substantially cut this time.

2. **Non-destructive technique**—Samples may be retained for subsequent chemical analysis.

3. **Minimum sample preparation**—Almost all materials may be examined on an "as is" basis.

4. **Versatility**—Method has been successfully applied to products routinely checked by vacuum-drying, azeotropic distillation, refractive index, and conductivity.

► **In addition, NMR is potentially attractive for continuous monitoring of process streams.**

Its chief disadvantage is that it is specific for hydrogen, and not for water as such. However, with most materials, it is easy to distinguish between signals contributed by hy-

How NMR Gages Moisture

Measurement of sorbed water by nuclear magnetic resonance (NMR) is based upon absorption of radio-frequency energy by the hydrogen nucleus.

In water, these nuclei are similar to rapidly spinning tops with permanent bar magnets embedded along their axes of rotation. In the absence of an external magnetic field, these spinning nuclei are oriented in random fashion.

But an orderly reorientation can be forced by a strong r-f magnetic field. And the amount of energy absored in doing this is proportional to the number of hydrogen nuclei, thus is a measure of sorbed water.

Absorption of r-f energy occurs over a narrow band of frequencies centered around the resonance frequency. For the unit described in this article, this frequency is 7.4 megacycles at a magnetic field strength of 1,750 gauss.

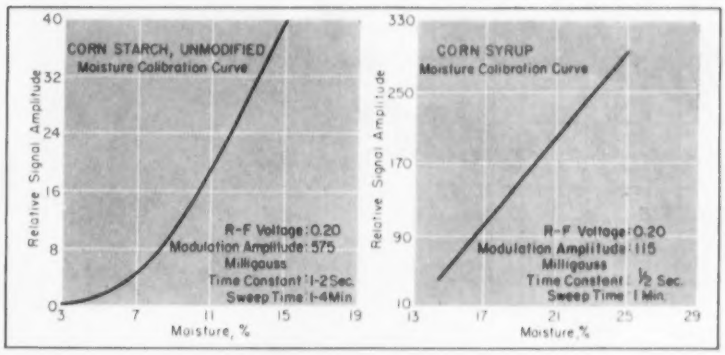
Resonance can be obtained either by holding the magnetic field constant and varying the frequency, or by fixing the frequency and changing the field strength. The latter technique is employed by the Schlumberger unit that we describe here.—*The Authors*

drogen in sorbed water and hydrogen that is present in more hindered forms.

Analysis by this method employs the magnetic properties of atomic nuclei that pick up radio-frequency energy. Under controlled conditions, this energy absorption can be related to the amount of material present. In the case of water's hydrogen proton, this provides a measure of the product's moisture content.

In 1951, the Corn Industries Research Foundation initiated a project in the field of NMR. The work was done at Southwest Research Institute, San Antonio, Tex., and resulted in construction of an NMR moisture meter (FE Apr. '56, p. 56).

We at Corn Products Refining Co. obtained a "control-laboratory" NMR analyzer (Schlumberger Well Surveying Corp., Ridgefield, Conn.) and have found it satisfactory for determining moisture in many of our products.



GOOD-TO-EXCELLENT correlation was found in these typical calibration curves. They relate NMR signal amplitude and product moisture content (gaged by conventional methods). Left: Data for unmodified corn starch, with moisture determined by vacuum-drying. Right: Corn syrup. Its moisture was checked by refractometer. Note NMR test conditions.

Unit and Operation

The analyzer (Model 100) is designed for quantitative measurement of moisture in industrial or laboratory samples. As shown in our lead illustration, it consists of a console and magnet unit. The console contains operation-control panels, recorder, and chasis for six removable components and four power supplies.

Housed in the magnet unit are a 1,750-gauss permanent magnet with 10-in.-dia. pole faces and a 2-in. gap. In addition, an r-f unit having an r-f coil, amplifier, and other associated circuitry, is located between pole faces of the magnet.

In operation, samples are introduced in glass tubes, which are inserted into the sample cavity inside the r-f coil.

One advantage of this equipment is ease of operation. It has a minimum number of operating controls, and can be used by personnel with little technical training. For most routine measurements, it is not necessary to touch any control except the "Start" button.

In some instances, however, it may be necessary to adjust other instrument parameters by means of controls located behind the console door. Position of each control can be specified for a particular material or moisture range, and changes can be routinely made without difficulty.

Method of measurement is comparatively simple. A weighed sample cell is filled to a predetermined depth, and the sample weight is determined. (Alternately, a constant weight of sample could be used.) The cell is sealed and placed in the sample cavity. A derivative curve is obtained by altering the strength of the magnetic field over a narrow range.

Only about a half-minute is required for peak-to-peak amplitude measurement.

Relationship between NMR signal amplitude and moisture content for a specific material can be established by measuring the peak-to-peak amplitude for a series of samples at various moisture levels. Each peak-to-peak amplitude, adjusted to a common weight basis, can be plotted as a function of moisture to furnish a standard calibration curve.

For calibration purposes, moistures are determined by vacuum-oven drying or other standard procedures. This curve can be used for determining moisture of unknown samples of the same material, providing they are measured

HOW NMR MOISTURE DATA COMPARE With Standard-Test Results on Confectionery Products

Sample	Number of Samples	Moisture Range, (%)	Approximate Sample Weight, (g.)	Sample Cell (Size)	Deviation From Correlation,* (% Moisture) Average	Maximum
Molding starch (new and recycled)	9	4.9- 8.2	35	Large	0.07	0.15 [1]
Corn syrup	10	15.1-24.5	15	Large	0.17	0.70 [2]
Soft jellies (at depositing)	7	21.5-24.9	8	Small	0.09	0.20 [2]
Jelly bean centers (at depositing)	7	22.2-25.5	8	Small	0.17	0.25 [2]
Jelly bean centers (before panning)	7	11.7-14.5	40	Large	0.04	0.10 [2]
Soft jellies (at packaging)	5	15.2-16.4	18	Large	0.10	0.20 [2]
Juju-type candy (at packaging)	5	14.3-16.1	35	Large	0.24	0.40 [2]
Marshmallow (circus peanuts)	13	3.1-10.8	25	Large	0.10	0.30 [2]
Fondant (candy corn)	7	4.0- 7.5	35	Large	0.12	0.25 [2]
Grained mints	5	0.0- 1.9	30	Large	0.10	0.20 [2]
Chicle	18	0.1-21.4	40	Large	0.18	0.80 [4]

*Control samples checked by: (1) Vacuum-drying, 4 hr. at 120 C.; (2) Refractometer; (3) Standard A.O.A.C. vacuum-oven method; (4) Azeotropic distillation with toluene.

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under equivalent instrument conditions.

A typical calibration curve for unmodified corn starch is shown. Here, NMR moisture values for unknown samples of unmodified starch are accurate to within about 0.2% in the 3-15% moisture range.

In addition, we applied this method to determine the moisture content of other items. Included were soft jellies at depositing, molding starch (new and recycled), a juju type of candy and soft jellies at packaging, marshmallow, fondant, grained mints, corn syrup, jelly bean centers before panning, and chicle. Sizes of sample cells and quantities of materials depended upon moisture contents of samples examined.

Typical results are shown graphically, and all data are summarized in our table. The graphs show relationships between NMR relative signal amplitudes and moisture contents, instrument conditions being noted.

All signal-amplitude measurements were corrected to a common weight basis. The table indicates types of samples, moisture ranges, approximate sample weights, and cell sizes. In addition, average and maximum moisture deviations from the NMR signal amplitude vs. moisture correlations are listed.

Good-to-excellent relationships between NMR relative signal amplitude and moisture content were observed for all samples examined. Where direct plant sampling failed to provide the moisture spread desired, higher-moisture products were air-dried, as needed. This was true of jelly beans before panning, soft jellies and juju type candy at packaging, fondant, and grained mints.

A wide moisture range was obtained for grained marshmallow by taking samples between 8 and 36 hrs. after casting. Several samples were also taken at packaging.

It is significant that NMR signal amplitudes corrected to a common weight basis are independent of sample particle size. However, the method does have limitations, as noted, and requires an understanding of sample composition, the way moisture is held in the sample, and the nature of possible interfering materials.

This article is based on a paper presented by the authors at the recent Annual Production Conference of the Pennsylvania Manufacturing Confectioners' Assn., Lancaster, Pa. —*End*

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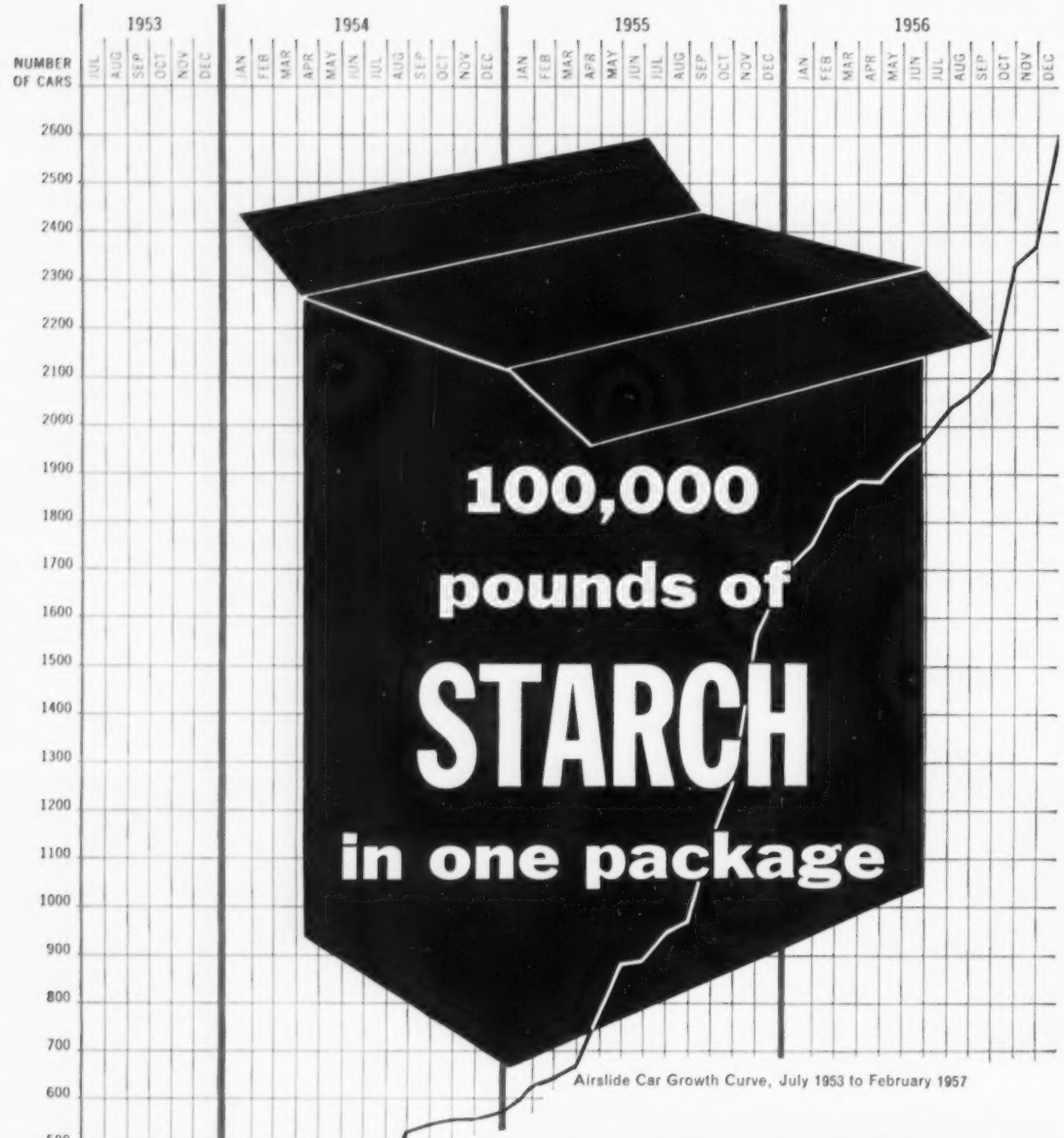

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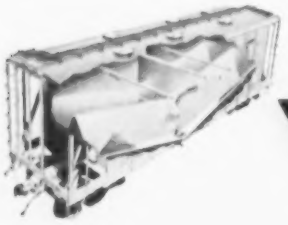

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Two Hard-Swinging Commentaries on

"Why I Joined the Union"

- **M. A. Joslyn sees challenge to educators and organized technologists in the situation of the unfortunate Charley in FE's February article.**
- **A chief food technologist looks upon Charley as a naive soul, believes his employer not typical, and see unionization inevitable**

Calls for Bold Action—Now

I WAS GREATLY IMPRESSED by the article, "Why I Joined the Union" (FE Feb., p. 57).

I have felt that the Institute of Food Technologists and the teachers of food technology have not fulfilled their obligations to graduates in food technology and to professional members. Either because of relatively lower demand or lower professional standing (of food technologists), chemists and chemical engineers command a preferential position—both in government and industry.

Our better graduate students at the U. of California prefer to seek positions in research and development in the food science field as biochemists, microbiologists, or physiologists—and not as food technologists.

In the undergraduate divisions, we rarely can attract students of high caliber who can qualify for curricula in chemistry, biochemistry, bacteriology, or engineering. Only rarely do we get good students who are attracted by the challenge and opportunities that training in food science and technology offers.

It's often stated that there is a shortage of food technologists. If so, the industry isn't as attractive to able young men and women as other opportunities. In general, the starting salaries are lower and opportunities for advancement less favorable than in the chemical, biochemical, and process engineering fields.

Too often, the position available is limited to routine quality control. Opportunities for product and process development and production supervision are restricted.

I realize that this is partly due to lack of drive and ability on the part of some of the graduates in food technology. But it is due also to the fact that we have "not estabalished a market for our product"—as pointed out in your article.

In 30 years of teaching food technology, it has been my experience that our most successful graduates have been majors in chemistry who have taken a minor in food technology.

Food technologists now are experiencing the situation faced a number of years ago by chemical engineers when their discipline was developing. The present high standing of graduates in this field is due to the formation and development of the American Institute of Chemical Engineers.

The AIChE very early developed a program of accreditation of curricula in its field. This contributed greatly to the prestige of graduate chemical engineers. And largely on the basis of this, AIChE sought, and obtained, recognition of the professional competence of its members.

I long have felt that the IFT should develop a similar program of accreditation and improve the position of food technologists in research and industry. At present, IFT still is a largely heterogeneous group of chemists, bacteriologists, dietitians, and nutritionists who happen to be doing research or other work in the food field.

Fundamentally, a food technologist is more than a bacteriologist or a chemist in the food industry.

There is a too strongly established specialization in this field in the belief that the present "expansion of knowledge and technique has made mastery of a single discipline difficult," as expressed recently by Prof. Melvin Calvin—who pointed out, however, that "the fragmentation of science into specialties is a serious hazard of modern research."

Science needs more researchers who will boldly break through artificial barriers of specialization. This is particularly true of food technology, based as it is on many physical and biological basic sciences.

It is my opinion that we as organizers and members of the IFT have been too complacent in waiting for maturity. It is true that food technology is a new profession. But we should not be content to await future developments and grow slowly and gradually as have other professional groups. It is time that we profited by the experience of other groups and boldly plunged forward.

—*M. A. Joslyn, Department of Food Technology, University of California, who further states: "This letter represents my own opinion, not necessarily that of my colleagues. I do not speak for the department, college, or university."*

Tech Men Will Join Unions

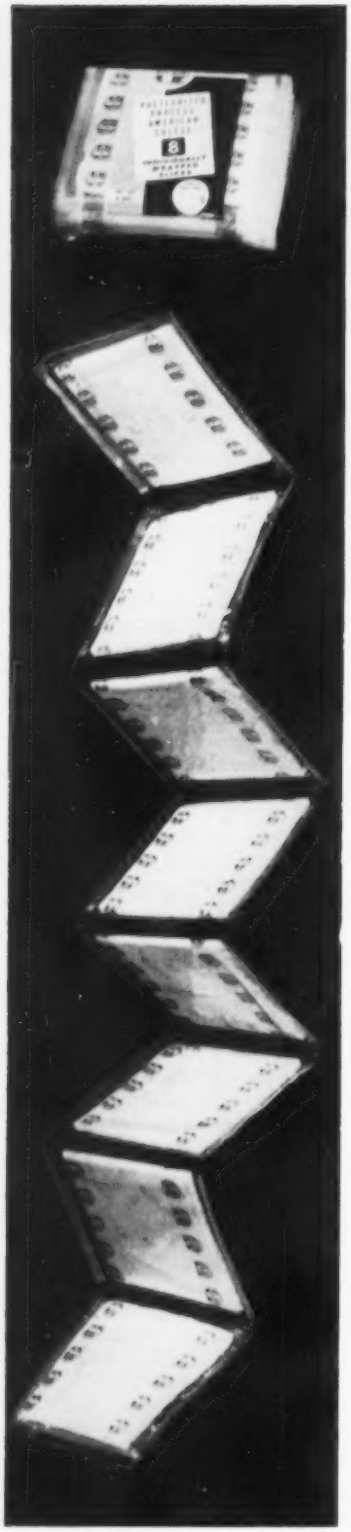
YOUR ARTICLE, "Why I Joined the Union" is very interesting. And in my opinion FOOD ENGINEERING is to be congratulated for having had the courage to publish it.

I have never had personal experience with any food industry company such as the one described in the article. Certainly, it is not typical of the industry.

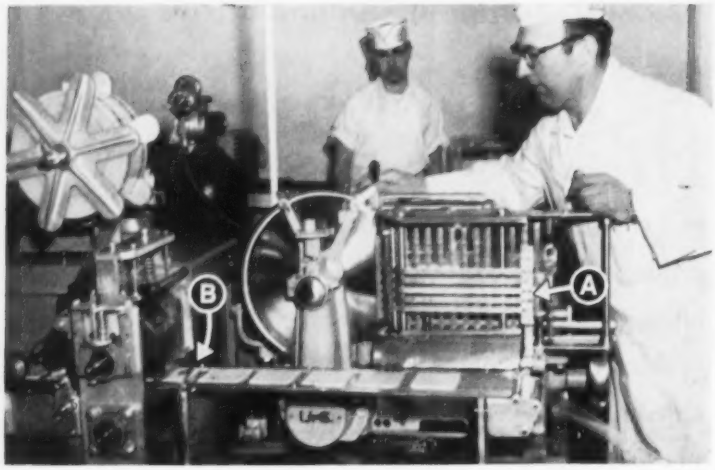
On the other hand, the picture I get of Charley himself is that of an extraordinarily naive soul. For example, to stick around with a company like his for 25 years, expecting to get anywhere, is plain silly.

Much the same thing can be said for Charley's conclusions. It becomes, he states, the responsibility of the scientific schools to "sell" industry on the value and proper use of scientific personnel. The schools, moreover—on pain of not balancing their budgets because of decreased enrollments—must "provide com-

(*Turn to page* 103)



EIGHT-POUCH LENGTH retails for same price as old-style package. Heat-sealed band holds folded units together.



RUNNING FULL TILT, packager turns out 160 pouches per min. Platten (A) accurately places cheese slices on film web. Second web forms package as nitrogen gas flushes air from product space (B).

Strip Pack

Convenience and increased food protection are top features of this new package that's formed in continuous lengths on high-speed machinery

ROBERT J. KELSEY
Assistant Editor, "Food Engineering"

PACKAGES that are portion-controlled—retail containers with internal subdivisions that boost home-life of the item after removal of the outer wrap—are proving the very hottest of developments. And they're going further.

Already evident in such foods as cookies, cereals, and crackers, the method is now being broadened—by a unique strip package that enables inclusion of such other foods as cheese.

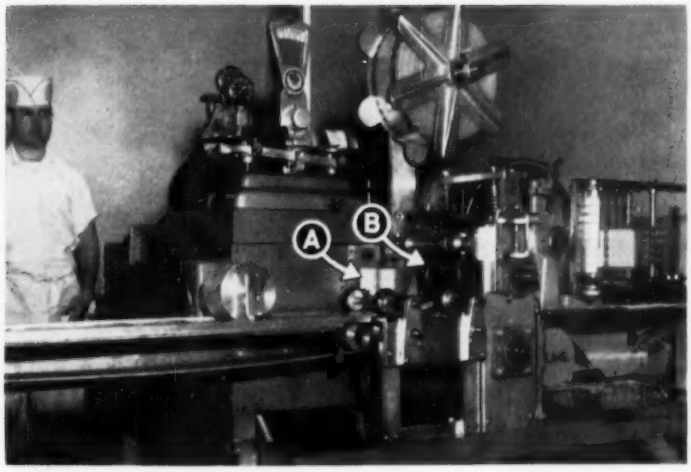
With this new package, single portions of food are sandwiched between two film webs, then heat-sealed in a continuous strip of individual pouches that can be marketed in any practical length. And low packaging costs, obtained through high speed mechanization, enable this container to compete, pricewise, with standard units on the market.

Each pouch is opened separately by the consumer without breaking the air- and moisture-tight seal on the others—thus preventing the onset of oxidation, dehydration, and mold growth. The processor can apply inert gas in the packaging operation to flush air from these strip pouches and boost shelf-life still further.

Fast Cheese-Packing Line

Pioneering U. S. application of this package is seen at June Dairy Products Co., Inc., Jersey City, N. J. Here, a single, high speed slicer and wrapper are teamed to turn out strip-packaged process cheese at the rate of 4,800 lb. per 8-hr. shift—160 pouches per min.

To insure a clean atmosphere for this packaging operation, with minimum risk of mold and bacterial contamination, equipment is housed in a pressurized room. Incoming air is passed through an absolute filter (Cambridge). And the positive pres-



GUILLOTINE KNIFE separates continuous web into eight-pouch strips at machine exit (A). Rotary die (B) forms all heat seals. Two girls then seal band around folded pack.

We've Been Bombarded

. . . with letters from FE readers who want more information on the strip packaging idea pictured in our Flexible Packaging Report (FE Nov. '56, p. 83).

The first commercial application of this unique technique was launched in early '56 by a Canadian firm, Crescent Cheese Co., Montreal. First U.S. processor is June Dairy Products Co., Inc., Jersey City—who's brand new installation is detailed in this article.

The food packaging possibilities suggested by this operation are almost endless. They range from solid flat foods (such as baked goods, meats, confections, and dried fruits) to granular products (such as mixes, drink powders, sugars, and cereals).

But whatever the product, the principle behind this container remains the same—it further promotes the growing trend toward portion control, increases product protection, and provides greater ease in household use—The Editors.

For New Portion Control

sure, created by a squirrel-cage blower, forces air to flow out through the three room ports (the main door, incoming cheese hatch, and package exit), thus sealing the room from unfiltered plant air.

All room openings are kept closed except when actually in use, and the only people allowed in the area are the operating personnel.

The process American cheese, formed into special 80-lb. blocks for this operation, is slid into the room on a roller conveyor. One operator puts the large rectangular units through a wire-die cutter (R. Howard Strasbaugh Eng. Co.) that divides them into nine smaller slabs, each weighing almost 9 lb.

This particular size is said to offer substantial savings over the 5-lb. blocks used in conventional slicing techniques. For, the percentage of waste—which stems unavoidably from the front and rear portions in both sizes—is but half that of the 5-lb. slab.

The blocks are fed into a high-speed slicer (Model UPC, U. S. Slicing Machine Co.), which cuts two cheese slabs at once. Resultant 1-oz. slices are accurately placed on a continuous film web, held in position by a supporting plate and guides, and are immediately pulled into the wrapper (Wrap-Ade Machine Co.). This step is supervised by a second operator.

Another film web is now drawn down over the product, and a continuously flowing jet of nitrogen gas purges air from the product space. Then a rotary die heat-seals each slice of cheese into its own pocket.

This die also cuts notches in the side seams on each pouch. And as the strip of packages leaves the sealer, perforations are stamped in the heat seals located between the pouches.

Next, a guillotine knite divides the strip into eight-pouch sections. These are folded and secured with heat-sealed cellophane bands by two women, then are slid through a wall port to a refrigerated case-off and storage room.

Special Film Gives Protection

Main benefits derived from strip packaging cheese are, of course, convenience and protection. In standard cellophane-wrapped packages—containing multiple slices of product—the individual slices tend to stick together. This is only partially cured by shingling the slices, and expensively corrected by interleaving them with paper. Also, once the housewife has opened this type of package it cannot be effectively resealed to protect the food.

The strip pouches are opened one at a time, as needed. The remaining slices are fully shielded from drying, oxidation, and mold attack.

The packaging material, a laminate composed of No. 300 cellophane coated with ½-mil of polyethylene (Cellothene, Cheslam Corp.), has high resistance to gas and moisture penetration and appreciably lengthens product life.

Standard cheese packs have a storage life of about 10 days under refrigeration. The strip-packed slices are good for over a month under the same conditions.

While this package admittedly uses more film than standard packs, it is a lighter material than those in general use. The high-speed machinery further cuts the wrapping costs, and enables June Dairy to market the product at the same price as its previous package.

The cellophane provides a fine ink surface. It is reverse-printed by a flexographic process in red (Wrapture, Inc.). This technique prevents scuffing of the design. The inks are sealed from the food by the polyethylene coat.

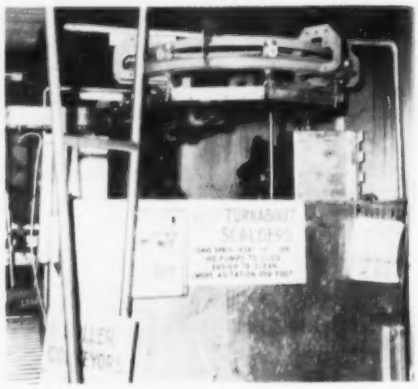
The cellophane band (No. 450, MSAT, printed in red, white, and blue) not only secures the package in an attractive display shape, but prevents store customers from breaking up eight-pouch strips. —*End*

Latest Units for Cleaning, Processing, QC

—are displayed at recent Institute of American Poultry Industries show in Kansas City. Highlighted are egg inspector, scalder, pickers, stunner, head cutters, gizzard cleaners, parts sizer, and bagger

Rot Detector, Compact Scalder

PHOTOELECTRIC CANDLER detects green rot in eggs by measuring internal fluorescence with phototubes in light-tight housing (arrow). By using two wavelengths varying factors of density and color of shell are minimized in the gaging. Unit spots internal bacterial spoilage at rate of up to 500 eggs per min. Exhibitor: Marketing Research Div., USDA, Beltsville, Md. (88A)



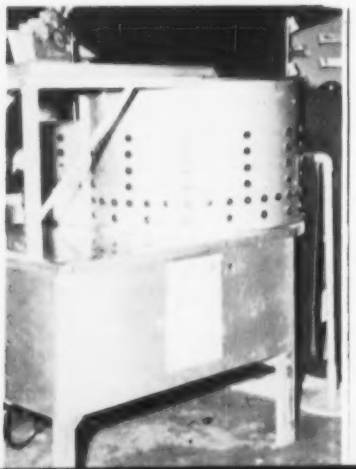
TURN-ABOUT SCALDER features double action, since it passes birds twice through center of tank. This is accomplished by increasing center width and producing more powerful agitation on backs and wings. Space-saving, easy-to-maintain unit is thrifty with electricity and heat. Confines hot operation to smaller area. Manufacturer: Kent Industries, Inc., Chicago. (88B)

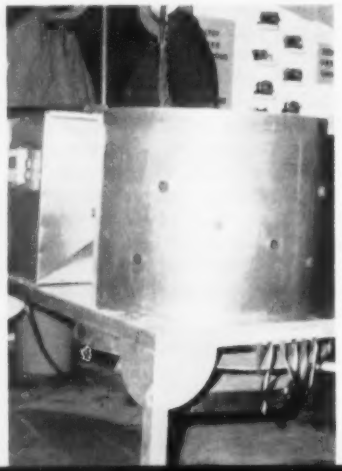
3 Feather-Removing Units

DEFEATHERING MACHINE employs centrifugal action in fast, intense removal operation. Precision-timed controls open and close water-spray line during dressing cycle and monitor automatic opening of door to discharge birds. Capacity: From 8 to 10 broilers or 2 to 3 Beltsville turkey hens per dressing cycle.—Pickwick Co., Cedar Rapids, Iowa. (88C)

COMPACT PICKER defeathers both small and large birds. It's batch-type unit with automatic water control valve, motor starter with overload protection, and timer with automatic reset (0-60 sec.). Picking fingers are short. Capacity: From 10 to 12 Cornish hens in 15 sec. or 2 tom turkeys in 18-22 sec.—Ashley Machine Co., Greensburg, Ind. (88D)

DUAL POULTRY PICKER is set up to operate continuously with scalded birds being fed into one unit while tested ones are discharged from other. Routine is timed from panel board. It involves the alternate sweeping of conveyed fowl into two pickers, dressing cycle, and discharge via hydraulically operated doors. Maker: Barker Poultry Equipment Co., Ottumwa, Ia. (88E)





Label imprinting costs cut by the Tickometer

Imprint labels *as you need them* with a Tickometer ... and save on printing, and label inventories.

Hundreds of manufacturers have found that they can reduce label costs, lower label inventories, save storage space and records, and avoid waste of unusable or obsolete labels ... by imprinting labels *as they are needed* with the Tickometer.

• The Tickometer prints up to 1,000 pieces *a minute*, can be set to imprint and stack a predetermined quantity. It has an impression area 2⅜ by ⅞ inches, gives close register. It can handle almost any type or weight of paper, or light card stock. Various models take sizes as small as 1 x 2 inches and up to 15 x 15. Feeds and stacks automatically, and can be operated by anybody.

• The Tickometer can also be used to mark, stamp, cancel, code or sign a wide variety of paper items in plant or office: cards, checks, coupons, job tickets, tags, forms, etc. – far faster than anybody can do by hand, at remarkable savings in time and effort. The Tickometer *counts* as well as prints – *so accurately that banks use it as a currency counter!* It records partial or total counts. Once you have a Tickometer, you'll find it can do many chores, at a great saving in clerical time.

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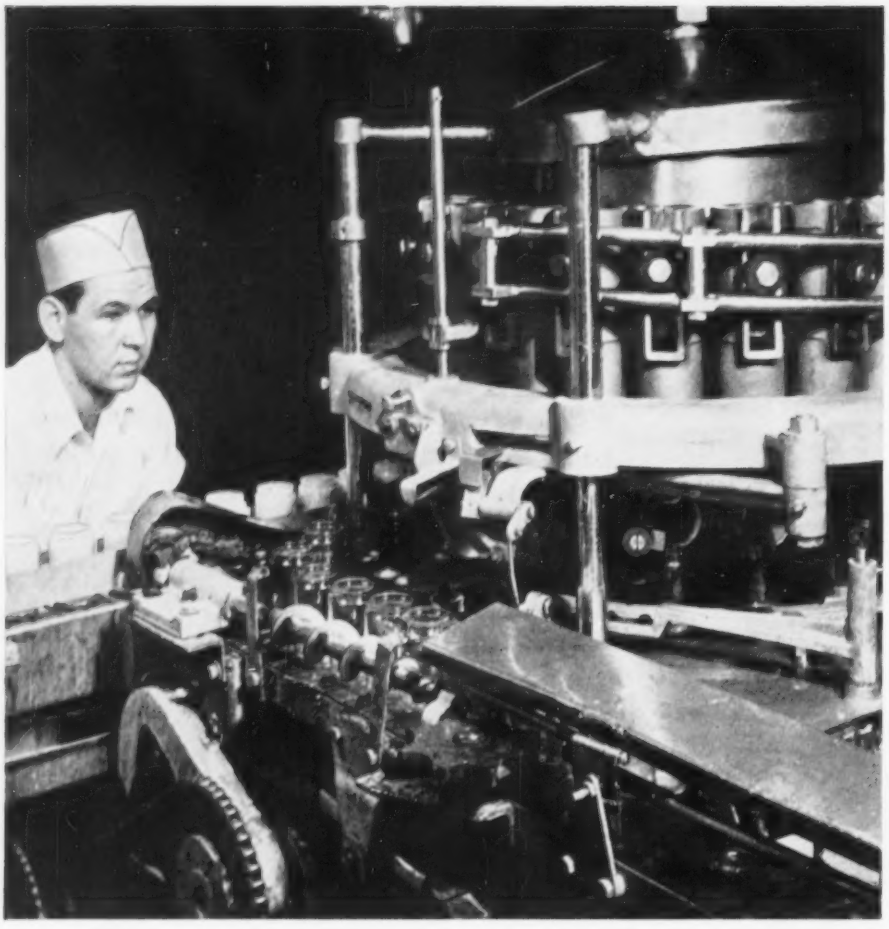
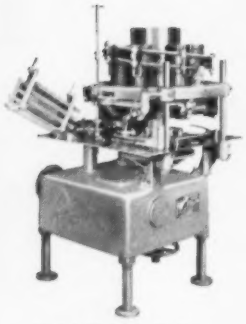
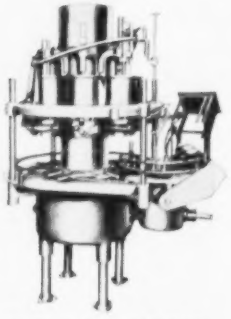
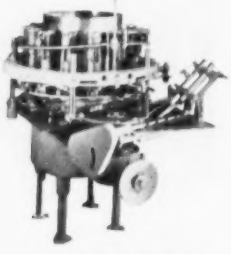




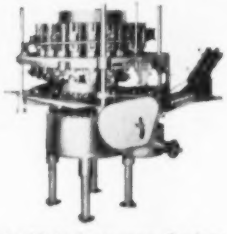
Model RP-6 Six Stations



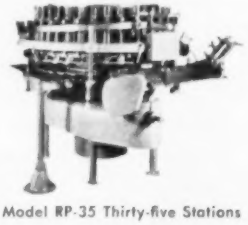
Model RP-7 Seven Stations



Model RP-14 Fourteen Stations



Model RP-21 Twenty-one Stations



Model RP-35 Thirty-five Stations

Look at what any *one* of these 5 fillers can do for you

If your problem is packaging *viscous* or semi-solid products, it's a safe bet that one of these Pfaudler rotary piston fillers will best solve it.

Pfaudler offers you—not one, but *five*—fillers to choose from. Each model is a little different from the others, of course, but they all give you these same advantages:

Faster Filling. There's no stop and go—containers flow through the filler continuously. This smooth container handling makes possible faster operation without spillage. Speeds range from 40 to 600 containers per minute, depending on filler model, container size, and product.

Low Operating Cost. Pfaudler piston fillers pay for themselves in a short time because they fill more cans per minute with lower total operating costs than other equipment.

Easy Cleaning. You don't need a single tool to clean the filler. Only the valves and pistons have to be removed – and the procedure for that is simple. One man can perform the entire cleaning operation in less than *thirty minutes.*

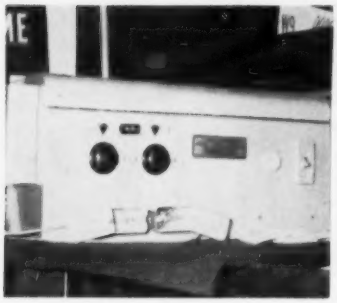
Built-in Container Protection. Your containers are kept in the best possible condition by polished handling surfaces, continuous motion, precise timing, and safety releases.

If you check your food packaging problem against all five Pfaudler models, you'll find *four* fillers that are almost what you want—*and the one filler that's just right for you.*

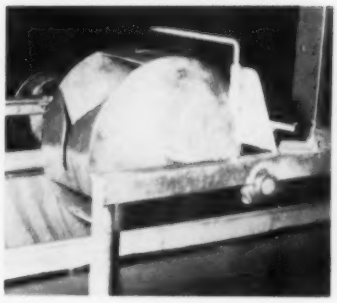
For more detailed information, contact your Pfaudler representative. Or write directly to us. Just ask for Bulletins 911 and 911-S.

THE PFAUDLER CO. Pfaudler **ROCHESTER 3, N. Y.**

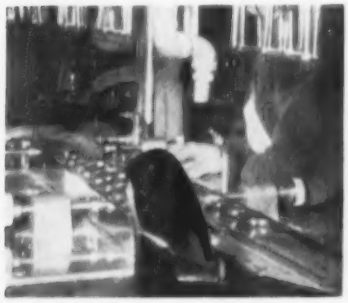
Stunner, 2 Head Cutters



AUTOMATIC STUNNER is installed 1 to 4 ft. ahead of sticker. Birds move heads down in cabinet, where fingers draw the heads into other fingers that electrically stun fowl on contact. The immobilizing fingers employ current generated by heavy-duty unit. Uniform stunning assures easier, faster sticking. —Cervin Electric Mfg. Co., Minneapolis. (91A)

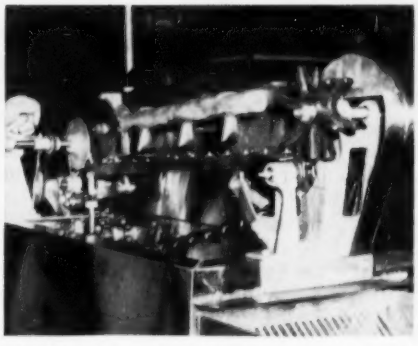


HEAD PULLER is rotary drum unit installed on eviscerating line. Head of shackled bird catches in one of drum's four 3¼-in. slots. Draw-down action does not jerk bird off conveyor. Device pulls out 90% of windpipe, saving extra operation, and yield is increased by snipping instead of breaking of head. Manufacturer: Paul Mueller Co., Springfield, Mo. (91B)

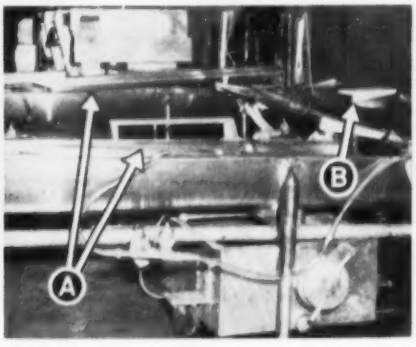


AUTOMATIC HEAD CUTTER operates at speeds up to 5,000 birds hourly. Designed to save labor and increase yields, unit is adjustable for small and large birds. Shackled fowl pass through vertebra-snapping rollers to high-speed circular knife with continuous water spray. Cuts are made where head joins neck.—Gordon Johnson Co., Kansas City, Mo. (91C)

2 Gizzard Cleaners, Bagger Parts Sizer



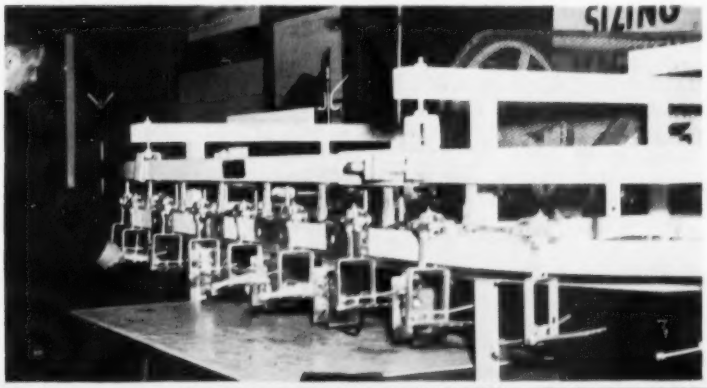
AUTOMATIC WASHER handles up to 2,500 gizzards hourly, splitting them before cleaning. Designed to meet rigid sanitary requirements, machine is built with stainless steel parts and hot-dipped galvanized frame. It features specially designed splitting saws. Overhead water sprays are employed.—Southern Equipment Co., Gainesville, Ga. (91D)



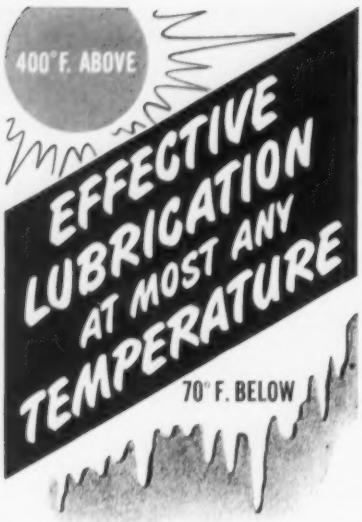
IN THIS CLEANER, jet system is employed for conveying hearts, livers, and gizzards from eviscerating line through inclined stainless steel troughs (A). Gizzards move through washer and peeler before proceeding along with hearts and livers to new vibrating-type gibblet-packing table (B).—Gordon Johnson Co., Kansas City, Mo. (91E)

NEW POULTRY BAGGER employs tension technique, instead of vacuum or hot-water shrinking, to snug-fit polyethylene bag to bird. Unit features tension-controlling air cylinders for rollers, double drive so rollers deliver required pulling power, and gearing to check slippage. Displayer: Herb Shelly, Inc., Farmington, Minn. (91F)

SIZING MACHINE is fully automatic and handles 5,000 chicken parts per hour. Apparatus is equipped with four scales set to ½-oz. weight variations and ⅛-oz. accuracy. An adaptation of conventional whole-bird sizer, unit employs mercury switches.—W. F. Altenpohl, Inc., Philadelphia. (91G)



For further data on these up-to-the-minute machines, circle key number on Reader Service Card in back of book.



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HIGH TEMPERATURES

LUBRIPLATE No. 930-AA.—Provides superior and protective lubrication for all types and sizes of machines operating at temperatures as high as 500°F. Possesses exceptionally high film strength and adhesiveness. Protects all metallic parts against rust and corrosion.

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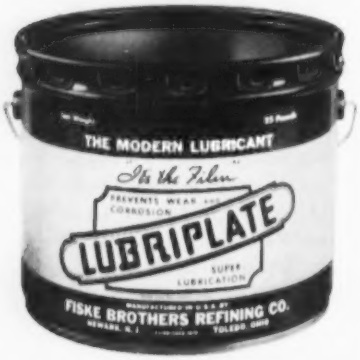
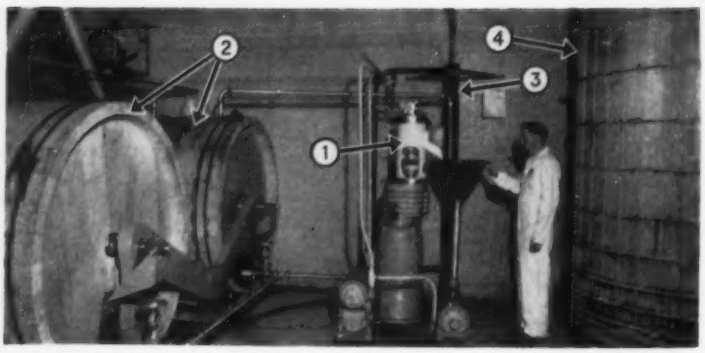
LOW-TEMP LUBRIPLATE—The outstanding multi-purpose grease type lubricant that will remain plastic at 70°F below Zero, yet has a Melting Point of 270°F. Resists water and acids—protects against rust and corrosion even from calcium chloride used on paved roads during winter months.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J. or Toledo 5, Ohio.





NEW UNIT (1) is compact. It grinds mustard slurry pumped from mixing tanks (2). Then heat exchanger (3) cools mix on its way to storage tank (4).

IMPROVED GRINDER 'KEYSTONES' NEW HIGH-PERFORMANCE LINE

Continuous, uniform disintegration of mustard slurry is achieved with 'one-pass' attrition mill

VERNE BLENDO
Senior Laboratory Technician,
Nalley's Inc., Tacoma, Wash.

PROGRESS in particle disintegration has been won in a new continuous, straight-flow mustard line. Highlight is the improved single-pass, highly efficient attrition mill.

The line is the newest addition to the multiple (related) food processes at our plant—Nalley's Inc., Tacoma, Wash.

We installed it adjacent to the mayonnaise department (FE Jan, '55, p. 85) in order to utilize the same 8-spout filler, and case filling and sealing units.

The 100-lb. bags of mustard seed are first dumped into a cracking mill hopper. Broken material is screened and air-conveyed to one of a pair of rotary mixing tanks. Here, water and vinegar are metered in, and spices added to form a 480-gal. batch.

Tanks rotate batches at 18 rpm. for a 4-hr. set-time. A 2-hp. motor powers a special roller chain drive that permits turning either tank or both at one time.

When set, slurry is pumped (Moyno unit driven by a 2-hp. variable-speed motor) to the feed port atop the new mill made by Morehouse-Cowles Inc.

This attrition-type unit is being put to many new uses in the food industry. Our own grinder has a 5,400 rpm. stone, and produces a smooth, creamy mustard of 0.0025 to 0.005-in. particle size. A 20-hp., 3,600 rpm. motor powers the mill. And it has rated capacity of 185 gph. However, we operate it at 100 to 150 gph. (usually the former rate).

Grinding warms the slurry to about 95F. A second Moyno pumps the product to a vertical heat exchanger that cools it 10-deg. and discharges into one of five wooden aging tanks.

These tanks (three 2,000 gal., and two 1,000 gal.) have multi-bladed agitators driven by top-mounted 3-hp. motors with belt reduction drives. They turn at 20 rpm. The central, vertical stainless shafts are supported by lignum vitae (wood) bearings set in the tank floors.

Mustard remains in the tanks at least 16 hr. Deaeration that takes place in this period reduces the potential of oxidation from the air picked up during milling (about 20%). Too, about 1% volatile mustard oil must be removed for a smooth product. Finally, the mustard is cooled at least 10 deg. for filling at 70F.

Finished product is pumped by another Moyno (5 hp.) through a 2-in. Pyrex line to the 8-valve mayonnaise filler. An automatic filler-bowl level control sets the pump feed. Mustard is packed in glass jars and barrels. —*End*

QUICK ACTION

Easy and quick– Yale Truck unloads fresh beans for fast processing.

YALE TRUCK MOVES FAST TO GET VEGETABLES TO PROCESSING AT PEAK FLAVOR

Speed in handling vegetables at their peak of flavor is essential at Seabrook Farms. That's why Yale Gas Trucks are assigned to haul big crates of fresh vegetables from receiving areas to points where processing begins. Equipped with rotating fork attachments, these Yale Trucks simply unload crate contents into a hopper which, in turn, feeds a conveyor belt. When handling beans *(see photo)*, the entire operation is so fast that up to 10 tons can be processed every hour during peak season–a typical example of Yale Truck efficiency.

Yale Gas Trucks provide instant power for fast, smooth starts, grade climbing and high-speed lifting... feature increased travel speeds, roller equipped channels for smooth lowering and lifting, conveniently located controls for easy right hand operation. Available with fully automatic Yale Torque Transmission, Fluid Coupling or standard transmission. Capacities: 2,000 to 20,000 lbs.

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Accent Stepped Up

On the Continuous and Automatic

Accelerated trend is reflected as bakery engineers detail new extrusion-sheeting development and note swing to non-stop bread-dough technique . . . Reveal latest on freezing factors, specialty formulations . . . Give various breakdowns on practical time, cost, and job-efficiency measurements

FE STAFF

EMPHASIS TODAY is on the continuous, more automatic methods—not alone in the actual processing but also in the various key phases of handling.

Moreover, there's new stress on gaging of formulations, on evaluations of the different freezing factors, and on breakdowns of time, costs, and also workers' duties.

This 1957 picture was brought into clear detail by the experts who addressed the recent 4-day annual meeting of American Society of Bakery Engineers, Chicago.

Highlights were the practical discussions on continuous sheeting and bread-dough techniques, "no cook-no cool" fillings, numerous closeups on freezing factors, procedures with fried pies and also special-occasion cakes, advanced methods of handling ingredients, and fine points on drafting of job descriptions.

Now to the particulars:

CONTINUOUS SHEETING, DOUGH MIXING

A new continuous extrusion-sheeting for sweet yeast dough was discussed by I. O. Rohrbach, Standard Brands Inc., N. Y. C. He cited hourly output, with six workers, up to 3,600 coffee cakes or 30,000 sweet rolls.

The new method involves hopper-feeding of dough through a flat extrusion nozzle and onto a variable-speed belt. From here, it proceeds to a multi-tier belt proofer for a 7-min. relax before going to roll-sheeter and makeup.

However, he went on, it is necessary to change from the sponge method to the sponge-dough procedure (65 to 80% sponge based on lard weight) before this mechanized technique can be adopted. Reason is that a straight sponge is punished too severely in extruder.

It is, he said, also essential to:

1. Use hard winter wheat on the sponge, and spring wheat flours on dough-sides.
2. Incorporate ¾% yeast food and a minimum of 5% yeast in the dough.
3. Add more yeast, if dough is high in sugar.
4. Adjust mixing time to get a well blended dough.
5. Raise dough to 85F. at last stage of mixing.
6. Allow at least 45-min. floor time from mixing to makeup.

For making a Danish-type product, he suggested using 15-20% high-melting-point (120F.) shortening during the last stage of mixing. This way, the baker gets a more uniform distribution of fat through the dough, and it stays in flake form up until baking.

More bakers are now showing an interest in the continuous bread-dough process, declared Harold W. McGhee, National Tea Co., Chicago. A number, he said, are now planning for adoption of this method instead of the intermediate stable-ferment, or brew, process.

It's noteworthy that the relatively few bakers who tried—and stayed with—the brew technique have been quite successful at it, saying it's simple and flexible.

Currently, there are six continuous bread-dough units in operation, with a seventh in the process of being installed. The most recent installation activated has now been running a half year, while the oldest has been operating for more than two years.

Current checkups, he said, indicate that installations of 20 additional units are in the planning stage.

"NO COOK, NO COOL" FILLINGS

Advantages of using pre-gelatinized starch in top-quality pie fillings were pointed out by C. C. Davis, American Maize-Products Co., N. Y. C.

They include: (1) Minimum amount of plant changes; (2) elimination of cooking and cooling, with result that fillings are prepared more speedily; (3) reduction in heating and refrigeration costs; (4) fewer storage tubs and cold storage runs; (5) greater pie filling yields, since there are no cooking losses; (6) greater uniformity in quality (better shape and flavor of fruits are retained); (7) clear fillings free of starchy taste and "weeping"; (8) better freezer stability and longer shelf-life; and (9) resistance to acids, heat, and mechanical shearing.

FREEZING ASPECTS PINPOINTED

Relative to freezing, there were pertinent talks on time and cost factors, cake vs. bread, cake-type doughnuts, benefits compared with objections, and dielectric defrosting.

Frozen baked goods can be an extremely important and profitable production for bakers. This was the firm belief voiced by Don F. Copell, Wagner Baking Co., Newark, N. J.

He cautioned, however, against the economic hazards that they entail for managements that fail to recognize the various problems pertaining to costs, profits, labor, inventory, sales, and distribution.

Bakers, he said, will fall by the wayside unless they keep abreast of the technical developments and cost-saving production improvements.

He then presented this revealing time-study rundown on preparation of 8-in. frozen fruit pies:

1. Pie-Making Labor Costs (12½ operators).	Production—3,900 pies. Time—2.8 hr. Total man-hours—2.8x12.5 = 35. Production per man-hour—106 pies. Cost per 1,000 pies—$18.78. Lb. of pies per man-hour—169. Cost per 1,000 lb.—$11.62. Average weight of pies—25 oz. Pies-per-hour of operation—1,396. Labor cost per 8-in. pie—$0.0188.
2. Wrapping Labor Costs (10 operators)	Production—2,586 pies. Total time—2.2 hr. Total man-hours—10x2.2 = 22.2. Pies per man-hour—117. Cost 1,000 pies—$17.08. Lb. per man hour—186. Cost per 1,000 lb.—$10.74. Average weight of pies—25½ oz. Pies-per-hour of operation—1,184. Wrapping labor costs per 8-in. pie—$0.0171.
3. Transport Loading Labor Cost (1,850 cases of 6 pies each or total of 11,100 pies).	Man-hours (4 men)—2.2. Total time—4x2.2 = 8.8. Units per man-hour—1,270 pies. Cost per 1,000 units—$1.58. Lb. per man-hour—2,010. Cost per 1,000 lb.—$0.994. Unit production per hour of operation—5,085 pies. Loading labor cost per 8-in. pie—$0.0016.

Mr. Copell then went into these time-and-cost specifics on 8-in. frozen applie pies:

1. Pie-Making Labor	Production—4,290 pies. Time—3.2 man-hours. Total man-hours—3.2x14.5 = 46.5. Pies per man-hour—92. Cost per 1,000 pies—$20.90. Lb. of 8-in. apple pies—1.46. Cost per 1,000 lb.—$13.52. Average weight of pies—26 oz. Units per hour of operation—1,341. Pie-making labor cost per pie—$0.0209. Apple-peeling labor per pie—$0.0099. Labor cost per pie—$0.0308.
2. Raw Material Costs	9 oz. dough at $0.0963—$0.054. 12 oz. apples—$0.064. 5 oz. sugar mix—$0.034. Total 26-oz. pie—$0.152.
3. Labor Costs	Apple peeling—$0.0099. Pie-making—$0.0209. Wrapping labor—$0.0171. Loading—$0.0016. Total labor—$0.0495.
4. Freezing Cost	For 8-in. pie—$0.0129.
5. Container Costs	Foil plate—$0.218. Box—$0.0248. Overwrap—$0.0150. Carton—$0.0136. Total container cost—$0.0752.
6. Total Costs	Raw material—$0.1520. Container—$0.0752. Labor—$0.0495. Freezing—$0.0129. Total—$0.2896.

It is to be noted that the costs named do not include manufacturing expenses, overhead, or profits.

More tolerance to freezing is exhibited by cakes than bread, according to J. W. Pence, Western Utilization Research Branch, USDA, Albany, Calif. And cakes can readily be wrapped and finished for freezer storage.

He saw no indication of cakes being either improved or harmed by freezing.

Six steps were recommended in the freezing of coated cake-type doughnuts. As outlined by M. Steinberg, Doughnut Corp. of America, N.Y.C., they are:

(1) Coating at 95F., (2) packing in moisture-proof boxes, (3) loading on perforated-screen trays with sufficient space between them for air circulation (sugared doughnuts with cellophane down), (4) freezing at —20F. with air velocity not less than 400 fpm., (5) storing up to 4 weeks at —20F., and (6) defrosting at 95F, with R. H. under 50%.

Advantages gained in freezing baked goods were cited by M. O. Maughan, of Chicago.

He said this practice: (1) Aids production, (2) results in less stales, (3) permits freezer stock-piling, (4) enables baking against inventory and not sales, and (5) increases sales. He mentioned the most common objections to freezing: Higher costs, hesitation relative to consumer acceptance, and reluctance of retailers to provide the necessary freezer space.

Possibilities are seen being worked out for dielectric defrosting, said T. Spooner, of J. W. Greer Co., Wilmington, Mass.

But, he declared, there remains a problem of moisture condensation in wrapped items. Moreover, the use of this technique for iced and coated products is not recommended.

FRIED PIES, "OCCASION" CAKES

Production of fried pies, said F. B. Dietrich, Brolite & Co., Columbus, Ohio, has great sales potential. He

SESSIONS WERE PACKED, since the bakery engineers were avid to hear the latest on each "hot" subject tackled.

Lactose enhances flavors.

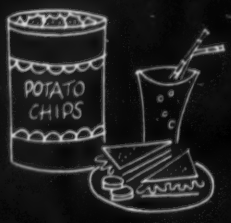
Acts as an excellent aroma catcher.

Serves as a pigment

absorbent.

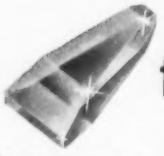
Provides uniform browning and

caramelization.



And, gives you

unique health properties.

Just think what Lactose can do  for your product!

Works wonders on everything...from roquefort cheeses to barbecue mixes. The new pricing pattern on milk sugar makes this amazing product a practical ingredient for hundreds of foods.

Lactose is a low sweetening, free flowing, crystalline sugar. It tenderizes, holds freshness, aids in dispersing and drying, and is not fermented by brewer's yeast.

Western Condensing Company manufactures Edible, U.S.P. and Fermentation milk sugar in granulations tailor made for your specific use.

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Remember, our coast-to-coast manufacturing and distribution facilities assure dependable supply and efficient service.

WESTERN CONDENSING COMPANY

Appleton, Wisconsin

A WORLD-WIDE SUPPLIER OF HIGH-QUALITY MILK DERIVATIVES

stated, however, that to gain increased acceptance required stress upon proper formulas—in order to facilitate processing and to assure top-quality goods at output rates from 3,500-4,000 pies hourly with only four operators.

One way is to start out with a lean-crust dough with sufficient corn or wheat protein to check shrinkage. This makes for control of amount of frying fat absorbed, insures a dry crust, enables dough to handle well on machines, and results in a crispy, palatable product.

Suggested dough can be prepared by blending 100 lb. of pie flour (8% protein), 25 lb. of hydrogenated shortening, and 100 lb. of dough scrap (from previous production). Then separately mixed are 30 lb. of water, 2 lb. of salt, 1 lb. of corn starch (optional), 2-4 lb. of corn or wheat protein, and 3 oz. of mold inhibitor. Both batches are then blended together to produce a smooth dough.

Actually, the dough is prepared in the same way as for baked pies. Only exceptions are to mix dough a little longer to gain a smoother consistency and to run it immediately through makeup or allow it to relax.

Many varieties of fruit filling can be used, and cream types can also be adapted. Generally, they must be firm, jam-like in consistency, non-starchy, and on the sweet side. For it is the condition of the fillings that will influence crispness and non-greasiness of crust.

Also offered by Mr. Dietrich were formulas for a variety of fillings like apple, cherry, apricot, peach, sweet potato, and pumpkin. Making a good apple filling, for example, involves: (1) Boiling 20 lb. of reconstituted apples, 3 lb. of sugar, 1 lb. of corn syrup, 1 oz. of salt, ½ oz. of cinnamon, 2¼ oz. of powdered lemon, and 4 lb. of water; (2) dissolving, adding, and constantly agitating (until batch thickens) 1 lb. of water and 4 oz. of corn starch; (3) blending and adding 1 lb. of sugar, 1 oz. of gum stabilizer, and 1 oz. of mold inhibitor; and (4) returning just to boil and then cooling.

Other quality-promoting suggestions included: (1) Controlling temperature of submerged frying for good crust color; (2) cooling firm pies prior to overwrapping with cellophane or waxed paper; (3) carrying printed instructions on the package relative to how the consumer should re-heat the pie, thereby enhancing acceptance; (4) dipping fried pies in a kettle of boiling water to set crust and remove excess fat (optional); and (5) glazing them (optional).

Reasonably priced decorated cakes of good quality should lead to greater volume and extra-profit business in a potential market that's been almost untouched, according to Earl B. Cox, Helms Bakeries, Los Angeles.

Where careful planning is especially necessary, he declared, is in the activities of the decorating department, the method of obtaining orders, and scheduling of production.

Suggested is 210-225 sq. ft. of floor space for each decorator and packer in a room with daylight lighting, along with additional lighting for each decorator.

INGREDIENT-HANDLING ADVANCES

Breakdowns on savings achieved through portable-bin handling of bulk flour were presented by William Kollman, Continental Baking Co., N.Y.C.

One of his examples was based on the assumption of a plant using 1,000 bags of flour weekly, with cost of flour figured at 30¢ per bag and cost of bins at $350 each, also assuming a 1-week supply of flour carried by bins. Breakdown follows:

Number of bins required	34
Cost of bins	$11,900.00
Lift-truck	$ 4,000.00
Special dump and miscellaneous costs	$ 3,000.00
Total	$18,900.00
Annual depreciation (on 10-yr. life)	$ 1,890.00
Depreciation per week	$ 36.40
Savings 10c. per bag net	$ 100.00
2c. per bag transport saving	$ 20.00
2c per bag in-plant handling saving	$ 20.00
Total savings per week	$ 140.00
Less depreciation per week	$ 36.40
Gross savings per week	$ 103.60
Gross savings per year (approx.)	$ 5,390.00
Return on investment in	3.5 yr

Mr. Kollman advised great care in any pre-figuring of savings. The economical advantage of any new method, he said, must be based on realistic comparisons with the specific plant's current practices. High efficiency of a present system would lower the range of benefits in making a change.

A semi-automatic system of handling miscellaneous ingredients in preparation for cake and sweet-goods mixing was hailed by J. H. Milne, of Dorothy Muriel's, Allston, Mass., as making for:

(1) More uniform product quality, (2) greater operating efficiency, (3) better plant sanitation, (4) less maintenance, (5) savings in floor space, and (6) sharper control over extraneous matter.

His company's system consists of ingredient-storage bins that occupy only 24x24 ft. of space on the 2nd floor. Ingredient flow is then controlled from a panelboard by the mixer operator on the floor below.

Scales, mounted on 6-in. grooved casters, ride along V-tracks set into the tile floor in the mixing room. Via these tracks, they are brought below 8-in.-dia. metal chutes that gravity-feed the ingredients from the 2nd floor bins.

JOB DESCRIPTIONS VITAL

For true efficiency, a description of every job in the bakery should be developed, in the opinion of John Schuster, Emrich Baking Co., Minneapolis.

Such breakdowns, he said are vitally important to the baker, both in the hiring and training of employees and also in job supervision.

As an example of this job pinpointing, he offered the following 30-step description of a dough mixer's duties:

1. Get to the bakery on time.
2. Change clothes.
3. Punch in.
4. Check shop temperature (close or open windows and radiators).
5. Check fermentation room (controls and wet- and dry-bulb thermometers).
6. Check mixers and scalers.
7. Check cooling-water jacket on mixer.
8. Check floor and hand scales for correct balance.
9. Check ingredients in mixing room.
10. Figure production orders for day's operation, with careful check on left-over dough in retarder and inventory of baked products.
11. Check time schedule set up by foreman for rest breaks and lunch periods, and plan accordingly.
12. Start mixing sponges on schedule.
13. Know formula for figuring water temperature to unload sponge from mixer at desired temperature.

14. Check and record sponge temperature and record mixing time.

15. Weigh and record sponge.

16. Scale and record dough ingredients.

17. Mix Danish dough in No. 3 mixer.

18. Weigh and record Danish dough, as well as record dough temperature and time out of mixer.

19. Run Danish dough into retarder.

20. Check racks and pans for roll crew.

21. Test-run roll makeup equipment.

22. Continue to scale and record dough ingredients.

23. Weigh back sponge, and record weight and temperature.

24. Watch mixing procedure for 1st dough and note dough consistency, also check on cleanup; use information on subsequent doughs to be mixed.

25. Check on any unusual situation with shift foreman.

26. Record temperature and time of dough out of mixer.

27. Orient 2nd-shift mixer on day's production.

28. Have shift foreman check day's mixing sheet.

29. Make out ingredient requisition for following day's production.

30. Check out. —*End*

Safety Drives Pay Big 'Percentage'

Hard hitting attacks will lift you out of the limbo of costly compensation—first saving you money and then winning you a profit

SHOULD YOUR PLANT mount an all-out offensive on the safety front?

Maybe you've hesitated about taking really firm steps—waiting for an answer to the question, "What's the 'percentage' in giving all the time and effort demanded by an aggressive approach?"

In truth, there's plenty of percentage. For instance, one organization—Bond Pickle Co., of Oconto, Wis.—has found that aggressive tactics against accidents can turn up a sizable saving and profit. This plant's action program—

- **Lowered insurance costs**
- **Smoothed production**
- **Improved employee morale**
- **Saved time in training of new personnel**

Call those "bonus benefits" over and above these two major achievements:

1. Claims ebbed from 56 in 1952 to 32 in 1956.

2. Lost-time accidents were slashed from 15 (199 days lost) in 1952 to 9 (75 days lost) in 1956.

Here's the story: Five years ago, Bond faced an average of 1 claim every 6 days. Its compensation insurance premiums were 66% over average.

One day a letter brought this discouraging news: "Your insured losses amounted to $24,677 for the last four years . . . and by applying the 4 to 1 ratio* you can estimate total cost of your accidents to be $98,708."

But then Bond buckled down. And last year insurance costs were lowered 23% under average. To accomplish this, the management put these cold facts to work: Accidents are a production cost that a strong drive by management and employees can trim. The cost targeted is both in health and in dollars.

To find out why, in a plant that used the best modern equipment, accidents occurred so frequently, L. H. Bond pored over the plant records, then laid the facts before his foremen. Also sitting in was a safety engineer from the company's insurance carrier (Employers Mutuals of Wausau, Wis.)

*A measure of the hidden cost of accidents.

MAKE SAFETY the worker's "way of life" and you're "in." Important aids are safeguarding devices—such as the rails around this cooking vat at the Bond plant.

Falls, it developed, were the biggest problem, causing 32 injuries in 1950 and 33 in 1951. Major trouble was wet shoe-soles skidding on the smooth-surfaced tile floor. Made slippery by juice and cucumber slices, the footing was most hazardous. Yet, there were falls even when the floor surface was dry.

Sand blasting of the flooring made a big improvement. Then new stepped-up washing procedures kept cucumber debris off the floors.

Finally, a rule was made that anyone who ran in the plant could be dismissed—and two subsequent firings proved that management wasn't fooling.

Emphasis was then placed on making every employee safety-conscious. Regular safety meetings were scheduled, and in these sessions each hazard was pinpointed and resolved. Here are some examples of the actions taken:

1. Moving parts of machines, including V-belt drives on processing room conveyors, were enclosed.

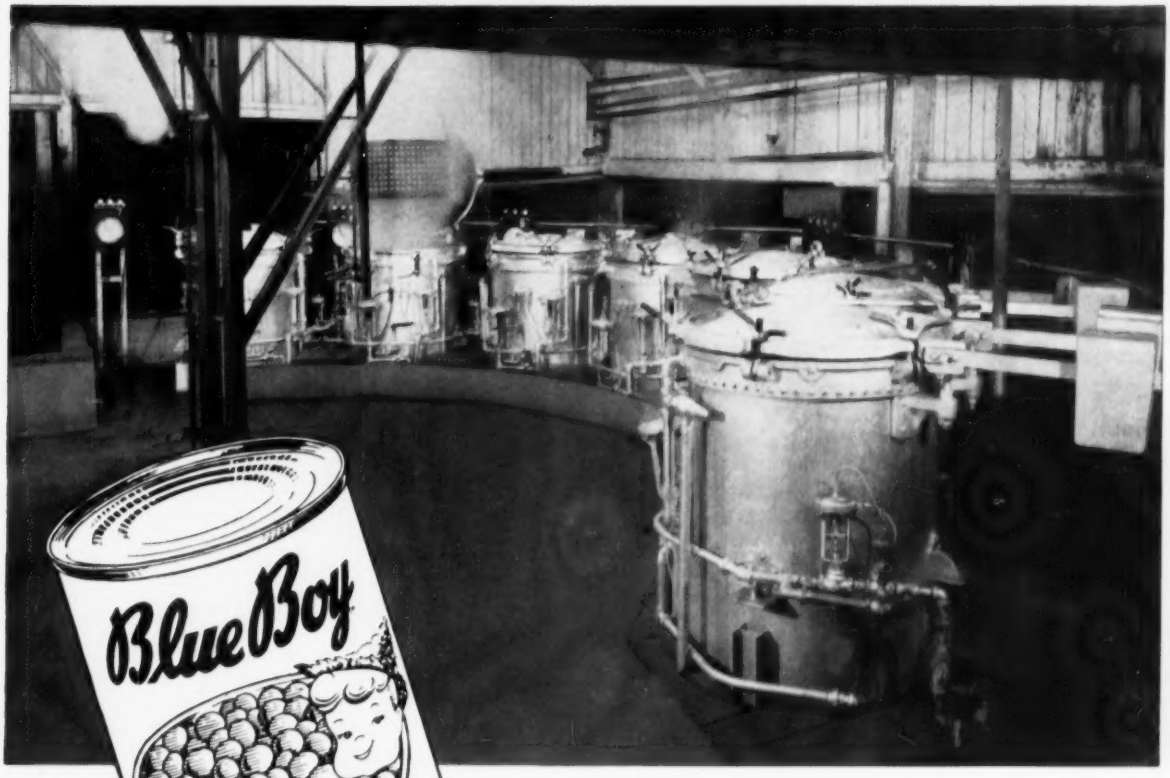
2. Guard rails were mounted around cooking vats.

3. Warning devices were fitted on lift trucks.

4. Caps were issued to women to guard against entangling of hair in machinery.

5. Palletizing and lift-trucking of materials replaced man-hauling wherever possible.

6. Traction on ramps was improved. —*End*



22 years with only one instrument overhaul

. . . the best costs less at Haxton Foods, Inc.

THE quality that goes into Blue Boy canned vegetables has been protected for 22 years by the Taylor 56R FULSCOPE* Control Systems on the retorts shown here. These instruments were installed in the Oakfield, N. Y., plant of Haxton Foods, Inc. in 1935. They've had only *one* major overhaul in the years since then.

Here's eloquent testimony to the fact that a few dollars extra in original investment in quality instruments pays off—not only in high quality processing and low maintenance, but also by paying for itself many times over through triple-life expectancy. And this is not an isolated case.

Taylor's Retort Control System automatically controls the processing temperature . . . *and* automatically controls the pressure during cooling. This automatic control means less operator attention, more accurate cook and cool . . . and a consistently finer product.

Taylor Instruments and Control Systems for food processing are at work practically from seed to shelf. See what Taylor can do for you . . . your quality . . . your profits. Call your Taylor Field Engineer or write to Taylor Instrument Companies, Rochester, New York, or Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

*Reg. U.S. Pat. Off.

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For more data, circle this page number on card at back →

NEW FREEZE-DRYING technique utilizes microwave energy to speed moisture removal of frozen product under vacuum. Dehydrated lobster tails are being removed from dryer.

ONE-FOURTH AS HEAVY after freeze-drying, four steaks at right have lost 1 qt. of water in process. They can be stored indefinitely without refrigeration and are reported to rehydrate in minutes. D. A. Copson, Raytheon lab manager, watches scales.

Advances in Freeze-Drying And Irradiation Cited

Dehydration from frozen state approaches break-through, technologists told at IFT meeting. New information on ionizing rays and enzymes also reported

FE STAFF

NEW INFORMATION on freeze-drying, irradiation and enzymes aroused considerable interest at the annual meeting of the Institute of Food Technologists, in Pittsburgh, May 12-16.

Of particular interest was the successful experimental application of microwave energy at 2,450 megacycles to frozen products in the vacuum chamber of the freeze-drying unit. Discussed by D. A. Copson, lab manager of Raytheon Mfg. Co., the technique applies "heat" throughout the product simultaneously to speed sublimation of moisture. And because the energy loss factor is much less in the dry food than in the ice, there is no danger of damaging the product.

A 1-in. rib steak is dehydrated in 5 to 6 hr. with the expenditure of 1,740 watt-hr. of energy. It appears feasable to reduce the time required in conventional freeze-drying by 75% or more if the method were put into commercial practice.

Shrimp, lobster tail, steak, chicken breasts, lima beans, and strawberries have been freeze-dried by Raytheon. These products retain their shape, and reconstitute readily.

Discussed at a special evening session was a possible break-through in food preservation by freeze-drying. Good quality, easy-to-reconstitute products with storage stability can be produced. The problem now is to develop high through-put equipment by making operations continuous and reducing operating time—the big cost-robbing factor.

Developments of this nature are foreseen within 3 years, if the industry starts immediate action.

Possible break-through techniques considered were nail (or spike) drying, vacuum-contact plates, dielectric heating, and radiant heating.

Nail drying with vacuum-contact-plates takes only 3 to 5 hr., instead of around 16 hr., emphasized R. M. Ballantyne, Defense Research Medical Laboratories, Toronto, Canada. Meats up to 1-in. thick (or even vegetables frozen into molds prior to freeze-drying) are loaded between heated plates equipped with aluminum spikes (⅜ in. x 1 in.) which penetrate the product at ¼-in. intervals. The spikes speed heat penetration to reduce freeze-drying time.

Taste could reveal no difference between fresh and reconstituted freeze-dried pork chops. Beef deteriorated only slightly. Cooked chicken and turkey came out well.

According to D. W. F. Hanson, British Joint Services Mission (Army Staff), British Embassy, Washington, D. C., a significant break-through already has occurred in freeze-drying. The method appears commercially feasible.

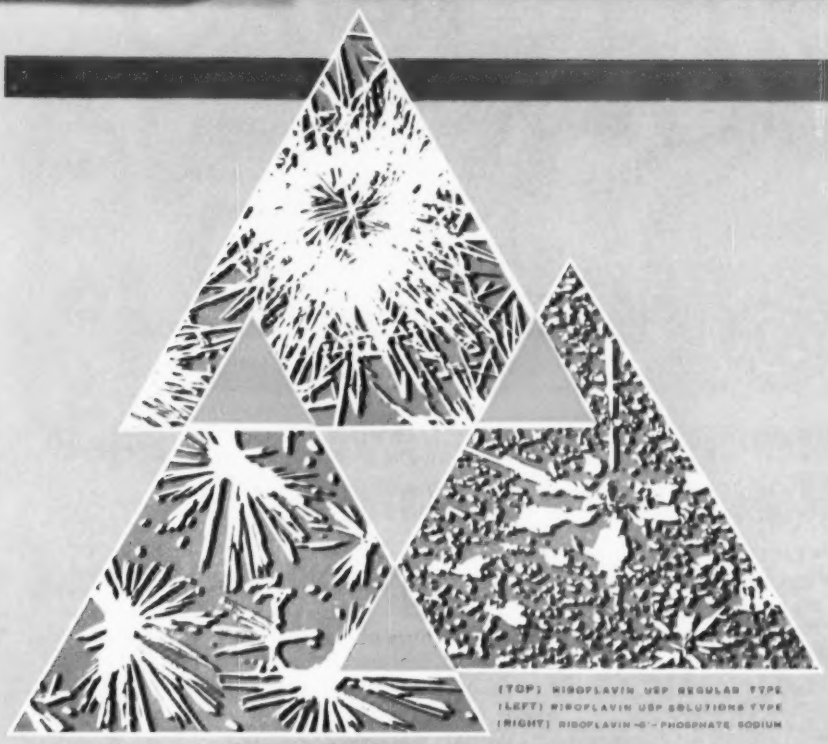
Full-size commercial vacuum-contact-plate equipment has been developed at Aberdeen. It was designed to vacuum-dry 1 ton of fish fillets per batch in about 8 hr., under about 10 mm. of vacuum. But the installation can be operated at less than 1 mm. pressure.

Rates of moisture losses from peaches under typical freeze-drying conditions and with infra-red, dielectric, and double contact plates as heat sources were discussed by S. Jackson, University of California, Davis.

It was found that dielectric heating was most rapid.

Irradiation Progress

Taste-panel members could detect "irradiation flavor" in bread baked with flour and milled wheat treated with ionizing radiation at 50,000 rep. level—a dosage sufficient



(TOP) RIBOFLAVIN USP REGULAR TYPE
(LEFT) RIBOFLAVIN USP SOLUTIONS TYPE
(RIGHT) RIBOFLAVIN-5'-PHOSPHATE SODIUM

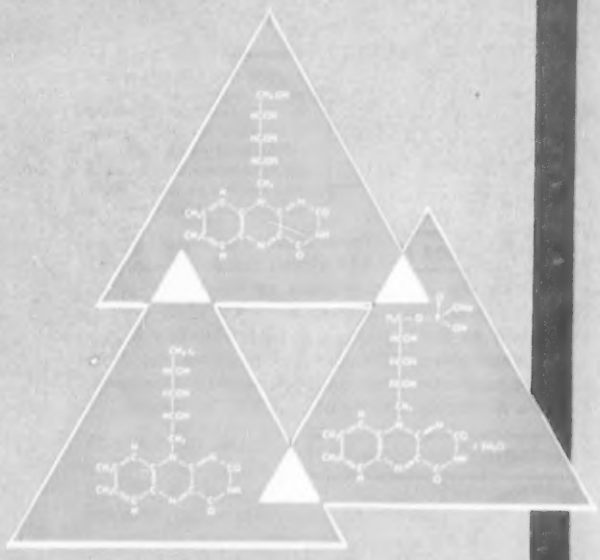
VITAMIN B_2 COMES RIGHT FROM ROCHE

Various types are available to meet the most exacting demands in the pharmaceutical field for tablets, capsules, dietary supplements, liquid preparations; and in the food industry for enrichment premixes and breakfast cereals. Roche has the type of riboflavin that is right for you, whenever you want it—"by the tons."

Roche originated riboflavin-5'-phosphate sodium for all solutions demanding rapid, high solubility, and stability. Among pharmaceutical manufacturers it is preferred for injectable solutions, elixirs, and multivitamin drops. A better, less bitter taste than U.S.P. riboflavin makes it advantageous for chewable tablets and other products likely to be held in the mouth. In the food field it is preferred for breakfast cereals.

The Roche synthesis achieves quality standards that meet, or even exceed the rigid U.S.P. riboflavin requirements. This assurance is insurance for you.

Trust Roche resources for a constant, unlimited supply of riboflavin. Trust Roche for quick, sure service.



ORDER *right* . . . ORDER *from Roche*

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(Illustration represents actual crystals under high magnification, using shadow technique.)

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✓ No solubilizer needed ✓ Commercial production

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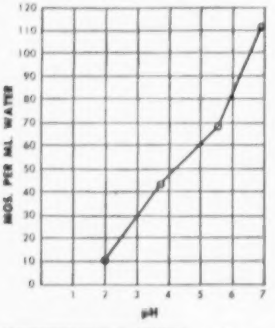
higher solubility

Now you can make clear solutions with a concentration of 30 mg. or higher per ml. of water when you use the new Roche riboflavin-5′-phosphate sodium. No longer do you need to use solubilizers and special techniques to achieve a satisfactory solution. Remember the trouble you had in getting a solution of even 2 mg. of riboflavin per ml.? Those days are now past.



SOLUBILITY of Roche riboflavin-5′-phosphate sodium in water at different pH levels; room temperature.

These data show that solubility of Roche B_2 phosphate sodium depends on hydrogen ion concentration in water. It is useful to note that the solubility of riboflavin U.S.P. (approximately 0.12 mg. per ml.) inserted on graph would fall just above the base line.

specifications

Tests show that B_2-5′ (M.W. 514.4) has the full theoretical activity on the molecular basis of riboflavin (M.W. 376.36). Theoretically one gram of the phosphate is equivalent to 0.73 grams of riboflavin. The Roche product contains small amounts of moisture, disodium salt, diphosphate ester and unesterified riboflavin. It has a riboflavin activity of 70-73% by weight.

biological availability

Roche riboflavin-5′-phosphate sodium has immediate biological activity because it is identical with the natural flavin mononucleotide occurring in the "yellow" respiratory tissue enzyme system.

better taste

Roche riboflavin-5′-phosphate sodium does not have the intensely bitter taste of riboflavin itself. It is more palatable in high concentrations. The different taste is of definite advantage in oral preparations.

solubility—taste demonstration

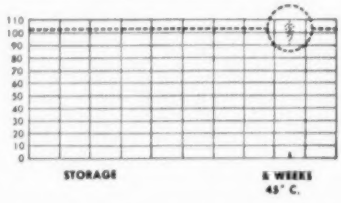
You can prove to yourself, easily and quickly, the solubility-taste advantages of Roche riboflavin-5′-phosphate sodium with the Roche demonstration kit. Ask your Roche representative to show it to you. Or we'll be glad to send one, without charge, at your request.

cost comparison

Even though the cost of Roche B_2-5′ is somewhat higher than regular riboflavin, its use can result in actual savings. You eliminate expensive solubilizers and unnecessarily large amounts of niacinamide. You reduce or eliminate costly complaints and returns. You are able to make manufacturing economies.

stability

Chart demonstrates stability of Roche product in B-complex parenteral solutions with and without vitamin C over wide potency range.



uses

The new riboflavin-5′-phosphate sodium, probably the most important riboflavin development since Roche introduced the vitamin commercially in 1941, is specially designed for use in manufacturing:

- **pharmaceutical** vitamin injectable solutions, drops and elixirs, gelatin capsules and chewable tablets
- **food enrichment,** especially if by liquid application

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to destroy grain-infesting pests, according to R. Nicholas, Michigan State Univ., E. Lansing.

Negative results were reported by E. A. Gardner, Florida State University, Tallahassee, on ionizing radiation of southern oysters at various levels from a cobalt-60 source.

Raw oysters heated below sterilization range of 6.3×10^4 to 6.3×10^5 rep. and then stored at 5C. were similar to non-treated samples from a quality standpoint. Appearance was the same, except irradiated oyster liquor was more turbid. Spoilage pattern was similar, too, during refrigerated storage.

At sterilization doses of 8.3×10^5 to 3.5×10^6 rep., results were no different. However, after radiation, a grassy off-odor developed, but it disappeared upon cooking. And the radiated raw oysters also underwent souring and pH drops similar to non-treated oysters.

Complementary effect of heat treatment and radiation (with gamma rays) of bacterial spores were looked into by S. A. Goldblith, M.I.T., Cambridge, Mass. As an adjunct to conventional heat processing, radiation might enable processors, like those putting up canned hams, to avoid full heat treatment.

Tests pointed out that subjecting water-suspended spores of *Bacillus cereus* and Cameron's *Putrefactive Anerobe No.* 3,679 to increasing does of gamma radiation increased their heat sensitivity. Heat-destruction of 90-95% of a culture of P.A. 3,679 spores, on the other hand, did not make the remaining ones sensitive to radiation.

By accelerating germination of bacterial spores, radiation dosage could be reduced to minimize off-flavor development, according to B. Kan, M.I.T. These spores could, he reported, become more sensitive to radiation by induced germination through use of such amino acids as adenosine and a combination of adenosine and L-alanine.

It is commercially feasible to irradiate liquid egg products for destroying bacteria of the *Salmonella* group and then spray dry into yolk or whole egg solids, according to J.T.R. Nickerson, M.I.T. Spray drying in this case, lessens radiation off-flavors produced from 850,000-rep. dosage.

There was a nonsignificant difference in whipping volume between irradiated and non-irradiated spray-dried egg solids. Irradiated eggs, on the other hand, needed longer whipping time. And there were minor flavor changes when irradiated egg solids went into sponge cake and custards.

Best way to sterilize apple slices by radiation was discussed by R. A. Gillies, University of Illinois, Urbana. It involves processing mature apples immediately after harvest by blanching in dilute sugar solution, vacuum-packing, freezing, and irradating at 0.5 megarep. Such treated apple slices were acceptable after 6 months storage at 75F.

U. V. Kills Egg Bacteria

Use of the centrifugal filmer for ultraviolet irradiation of egg white shows promise as a practical *Salmonella* control measure, stated H. L. Hanson, WURB, Albany, Calif.

The filmer comprises feed pipe, stainless steel centrifugal barrel, six u.v. lamps, and collector on top of barrel. Speed of barrel is up to 1,750 rpm. Depending on speed of centrifuge and flow rate, egg white film thickness ranges 30 to 150 microns. And whites are not injured when striking bowl at speeds up to 1,750 rpm.

Irradiated whites do not adversely affect angel food cake volume. However, it is necessary to whip treated whites longer.

New Enzyme Discoveries

Removal of oxygen from hermetically sealed containers of whole dry milk is effectively achieved by including packets of glucose-oxidase-catalase. And tests indicate improved acceptability of the product stored with the enzyme system, according to G. W. Kurtz and Yumio Yonezawa, of Quartermaster Food & Container Institute, Chicago.

Chemically treated filter paper is a convenient tool for routine peroxidase determination, it was reported by H. J. Morris, WURB, Albany, Calif. In checking blanching of vegetables, an extract of the product may be put onto the treated paper, or the moist surface of the product may be touched against the paper. Ortho-toluidine and urea peroxide are used to sensitize the paper.

Development of pink color in onions during dehydration is not due to bacteria, according to T. M. Lukes, Gentry Div., Consolidated Foods Corp., Gilroy, Calif. The color comes from enzymatic action that produces a colorless compound which, in turn, reacts with amino acids in the onion juice. —*End*

"Why I Joined the Union"

—*Continued from page 85*

plete directions for adequate and necessary maintenance of their products." Whatever that means.

This is a real cozy notion. Why make it the responsibility of the schools? Why not have the government take over and be responsible? If Charley wants to pass the buck, why not pass it right down to the end of the line?

Neither Charley nor his company is willing to shoulder their own responsibilities, or to adjust, individually and corporately, to the world as it is today.

However, the deeper question is that of where the technical employee belongs. On the management side of the fence—or the labor side? Does he take his place in the union—or take his chances with management outside the union?

In my opinion, sooner or later most technical employees are going to be union members. It "figures" that way—particularly with the growth of the large, multi-plant companies employing dozens, or even hundreds, of technically trained personnel.

To say that these men at all levels are part of management's team, simply because they've had a specific type of education, is nonsense. Under such conditions, a union becomes the only means whereby the technical man can talk with management—even though it be through a union agent—on anything like equal terms.

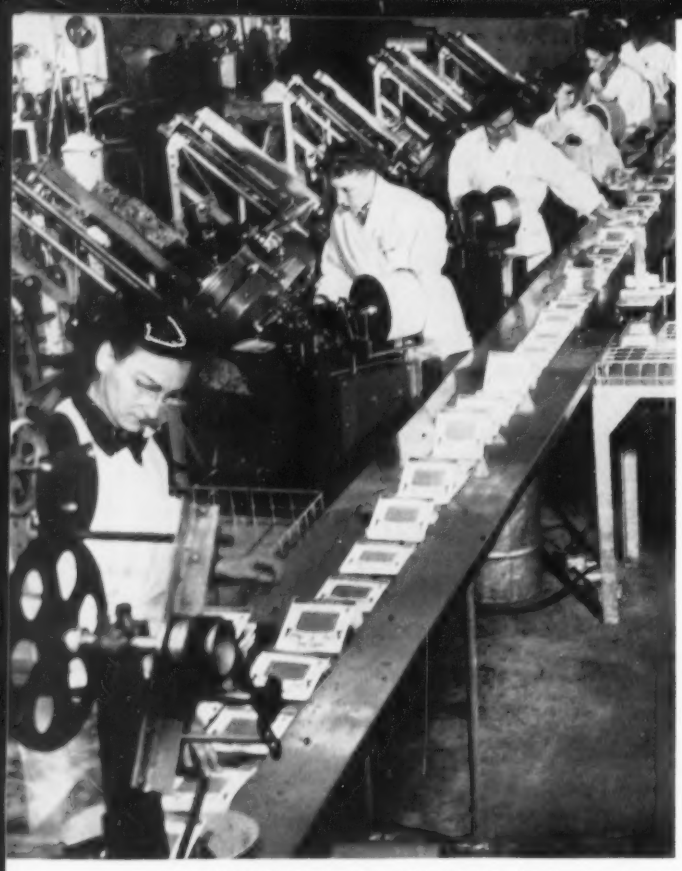
As Charley said, the union put an immediate end to that favorite management gambit: "If you aren't happy here, then. . . ."

The professional societies, such as the ACS or the IFT, are not organized to put the technical man in a better bargaining position. Some unkind critics might argue that the societies are too management dominated to be especially interested in that side of a technical man's life. Apparently only a union is interested and is organized to take effective action.

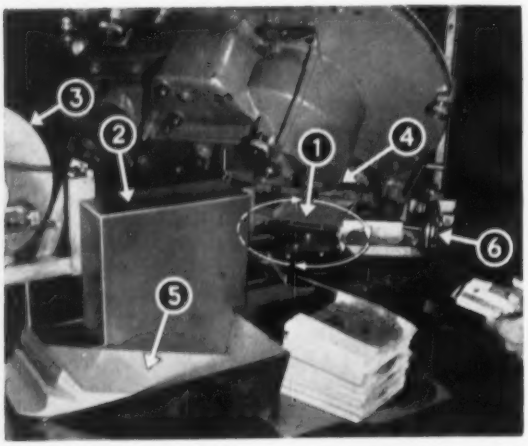
Did Charley make the right decision when he joined the union? Yes, he did.

Charley's statement in regard to how vital it is for top management to be individually close to all technical personnel, in order to forestall unionization, is so much mush.

—*Chief technologist of a food manufacturing firm.* —*End*



STRAIGHT-LINE action achieved. Credit the new inter-leafer (see closeup below) that synchronizes slicing, packaging, wrapping. Line capacity: 85 packages/min.



SHARP FOCUS ON UNIT: In interrupted rotation, each tray, such as seen (1), is indexed under inter-leafer (2), which cuts and positions wax paper (3) on trays. Latter then move beneath slicer discharge (4) where six slices (to form one steak) drop onto paper, and slicing stops automatically. Cycle is repeated, then operator removes inter-leafed steaks and puts them into folder (5). Micromatic control (6) permits infinite adjustment of slice thickness within $\frac{1}{16}$ to $\frac{1}{4}$ in. range.

New Inter-Leafer

Here's real cooperative engineering. The processor outlines the special machine he needs—the engineer designs and builds it. Result: Chip steaks come off in a uniform flow—since every operation is "balanced," from slicing to leafing to packaging to wrapping

C. R. HAVIGHORST
Senior Associate Editor, "Food Engineering"

"WE DREAM UP our own mechanical improvements. Then, when our ideas really seem feasible, we turn them over to engineers for the necessary refining, designing, and building."

This approach, described by President V. Cheney, has paid off handsomely at Chip Steak Co., Oakland, Calif., where the need for specialized equipment has made heavy demands on inventive ability.

"Our latest advance," he points out, "combines a new inter-leafer with a chip-steak interrupted slicer. This has provided the means—long sought—for straight-lining of slicing, packaging, and wrapping operations. And this, in turn, has reduced hand labor by 50% and boosted output 12½%.

This company produces a number of other packaged meat products. The machines used for all its products have sprung from ideas that were first proposed by Chip Steak, and were then developed by Package Enterprises, Inc., San Francisco.

This fortunate alliance started nine years ago when these two companies teamed up to turn out the chip-steak slicer as a replacement for the makeshift, adopted bread slicer formerly employed.

Product's Fragility Posed Problem

Chip steaks are made from chunked hamburger-grade beef. This meat is frozen into loaves to facilitate cutting it into the $\frac{1}{16}$-in.-thick slices used. Six of these slices are combined in a stack to make a 2-oz. steak. And when it is cooked, this product is remarkably tender and juicy.

The thin slices of frozen meat are so fragile that they may fracture and crumble even with delicate manual handling. Thus all efforts, since the old days of manual handling when using the bread slicer, have been directed toward total mechanization of the process. Today, such handling has been minimized. And the little still requisite—the gentle sliding of inter-leafed steaks from trays into packages—is done by trained operators.

Successful development of the first slicer spurred

Perfects Straight-Line Processing

further refinements. They followed in rapid succession, starting with hand-wheel control of the critical slice-thickness. The wheel regulates the feed-screw which, by a back-clamp, moves the loaf through a restricting orifice to the knife. Interrupted feeding is achieved by means of an interchangeable counting-cam.

One Idea Breeds Another

The first mechanical inter-leafer still relied too heavily on manual accumulating and positioning of the six slices per steak. However, it sparked the development of our present semi-automatic inter-leafer and permitted precise integration of the slicing and packaging.

The new inter-leafer consists of five trays that rotate (spoke-like) horizontally. Each tray is first indexed under the inter-leafer to receive a sheet of wax paper, which is cut from roll stock. Next the tray rotates to a position under the slicer, where six slices of meat are stacked on it. Then slicing is interrupted until the following tray is positioned.

Since there are two steaks per package, this sequence is repeated. The operator then removes the two inter-leafed steaks and places them in a cardboard folder. These bleached sulphite-board folders are scored for easy folding, and are printed in three colors.

There are five units on the line, each producing 34 steaks per min., or 17 packages. The total production of 85 packages per min. is placed on the wrapper's extended roller-chain feed, which forms the take-away conveyor. This output is the normal capacity of the wrapping machine.

Wrapped packages are then packed 12 to a carton and 12 of these cartons to a box. Product is then palletized and placed in sub-zero rooms, where its temperature is reduced for preservation.

As in other efficient food-freezing units, the aim here is to quick-freeze. This produces desirable small-crystal formations in the meat's cellular structure and improves quality of the finished product. Latter is hard-frozen in this unit in 2¼ hr.

Meat loaves must be at 29F. to avoid excessive fracturing or curling when sliced and packaged. When first removed from the freezer, loaves are far too hard for slicing. So they are placed in tempering rooms, where temperature is raised first to 26F., and then up to 29F.

Freezer Is Unique

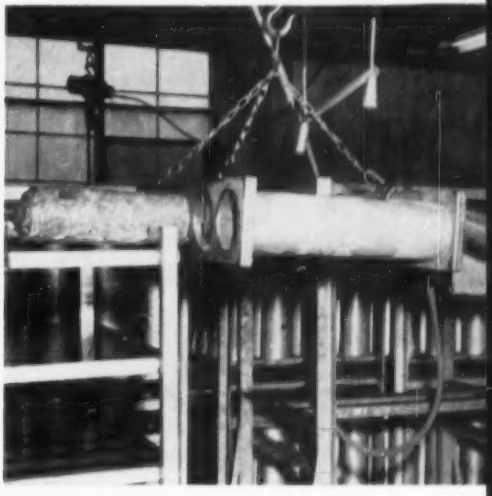
Prior to the freezing, chopped meat at 40F. is compacted in a mold, a Neoprene-gasketed stainless lid is firmly fixed over its top by spring-loaded clips, and the mold is immersed in the freezer—all in 3 min. When charging the unit, molds are easily moved forward on a roller-conveyor floor to make room for incoming product.

The freezer has a capacity of 32 banks of molds, each bank having 5 cylinders, and each cylinder holding 13 lb. of meat. Entire unit is 29 ft. long and 8 ft. wide, and employs 8 in. of glass-type insulation. A

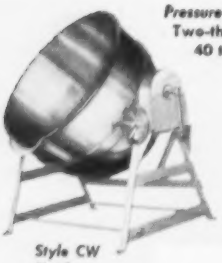
FLASHBACK: Molding, Freezing, Releasing

INITIALLY, coarsely chunked meat is compacted by stuffer into cylindrical loaves (5-in. dia. x 24 in.) in banks of 5 molds.

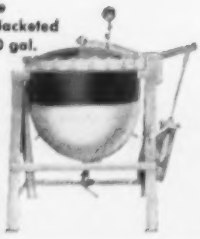
THEN, molds are lowered by air-powered hoist into immersion freezer. Latter has roller-conveyor floor for easy handling of molds in tank.



FROZEN LOAVES, first loosened by warm-water spray, are forced from mold (above). It's done by applying 90-psi. air pressure.

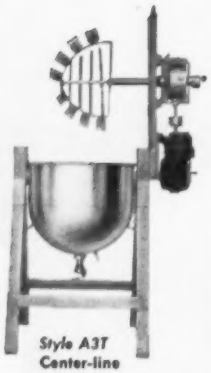


Pressure Kettle
Two-thirds Jacketed
40 to 200 gal.



Style CW
Kettle
Two-thirds Jacketed
80 to 300 gal.

REDUCE YOUR PROCESSING COSTS WITH LEE EQUIPMENT



Style A3T
Center-line
Scraper
Agitator Kettle
25 to 300 gal.

Style A Kettle
Two-thirds Jacketed
5 to 500 gal.

Style C Kettle
Two-thirds Jacketed
5 to 100 gal.

CORROSION-RESISTANT
Built from time-proved stainless steel

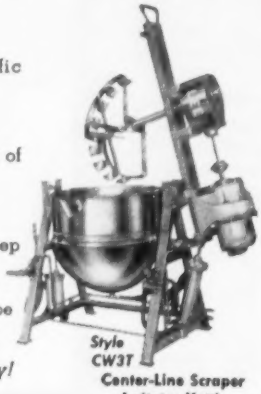
WIDE RANGE OF SIZES
To fit your exact requirements

INDIVIDUALLY DESIGNED
To meet your specific processing operation

PRECISION-BUILT
To give you long years of peak performance

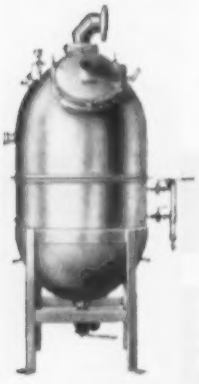
LOW MAINTENANCE
Easy to clean and keep clean

Style B Kettle
Full Jacketed
10 to 300 gal.



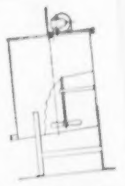
Style
CW3T
Center-Line Scraper
Agitator Kettle
80 to 300 gal.

Our technical bulletins describe this equipment in detail.
Write for them today!

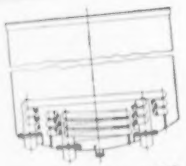


Vacuum Pan
50 to 500 gal.

416 Pine Street, Philipsburg, Pa.

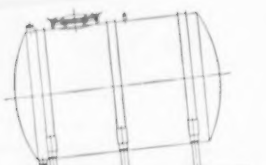


Mixing Tank
25 to 500 gal.



Pulp Tank 500 to 2,000 gal.

Quick Cooling Pan
50 to 200 gal.



Storage Tank 100 to 5,000 gal.

60% solution of propylene glycol is used as brine.

A two-stage ammonia refrigeration system (140 ton) serves the tempering and freezing rooms, also refrigerates the immersion-freezer brine. Only 40 tons of refrigeration are used for the brine, and this is dropped to 20 tons at night to maintain brine temperature of −25F. Except for weekends, the freezer is continuously operated to provide a uniform supply of frozen loaves.

Rapid Heat Transfer

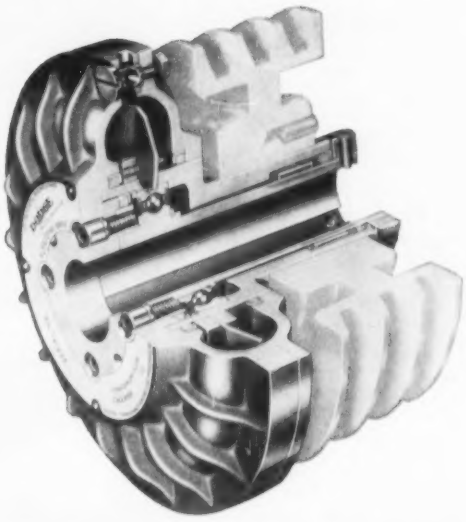
Baffles in each channel direct a 20-fpm. linear flow of brine through the mold interstices. This provides a highly efficient heat exchange with this secondary refrigerant.

Although molds are drained upon removal, carry-off depletes the solution. Thus it is replenished, about every 45 days, by addition of 52 gal. of propylene glycol. After each use, molds are scrubbed with a rotary brush and detergent solution.

When the product is hard-frozen, molds are passed through warm-water sprays to defrost only the surfaces of the loaves. Latter are removed from molds by applying compressed air to a valve in the bottom of each cylinder. Valves are securely covered by Neoprene gaskets when they are immersed.

Loaf product is then moved into the tempering room, where it is held until ready for slicing. —*End*

"Helen, I believe the boss wants you."



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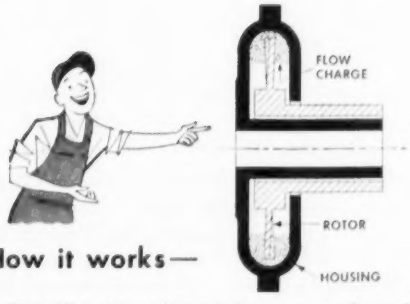
For Soft Starts and Smooth Handling of Food Conveyor Lines!



How it works—

The "fluid" in Flexidyne is heat treated steel shot. A measured amount, called the flow charge, is contained in the housing, which is keyed to the motor shaft. When the motor is started, centrifugal force throws the flow charge to the perimeter of the housing, wedging it between the housing and the rotor which transmits power to the load.

After a momentary slip between housing and rotor the two become locked together and achieve full load speed, operating without slip and at *100% efficiency* during the running cycle.

Reports on many successful installations in the food field bring praise for the superior performance of Flexidyne, the Dry Fluid Drive. Here is a new and better answer to your drive problems. Flexidyne starts heavy loads smoothly, protects machines from shock and motors from overload. It saves power. It gives 100% efficiency during the running cycle.

Flexidyne is so simple, operates so dependably, offers so many advantages that you should have complete information now. Call your Transmissioneer — or write for Bulletin A-640.

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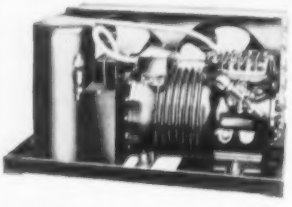
CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

For more data, circle this page number on card at back →

getting there is only half the job!



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Choose from ½ to 3 H.P. in Copelametic, the direct-drive accessible hermetic, and economical belt-driven models. Model TR-100 shown.

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Thousands of Copeland units now in use have given years of trouble-free, over-the-road service—proof of superior engineering, ruggedness and dependability.

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Our unexcelled coast-to-coast network of 130 wholesalers and over 25,000 refrigeration dealers means the best in service when you need it. It's only a phone call away.

Copeland refrigeration does the rest . . . keeps food fresh!

Antiquated methods of food delivery are giving way to refrigerated trucks all along the line . . . for retail, wholesale and house-to-house delivery of perishables. There's a practical reason: Freshness and profit go hand in hand. Now, fleet operators and food processors protect payloads with refrigerated trucks powered by time-proven Copeland units.

Whether holdover or over-the-road, a Copeland unit protects valuable perishables. Plugged in at stops, or driven directly, a Copeland truck unit produces cooling you can count on all the way . . . at lowest cost per mile.

SINCE 1918

Copeland REFRIGERATION CORPORATION, Sidney, Ohio

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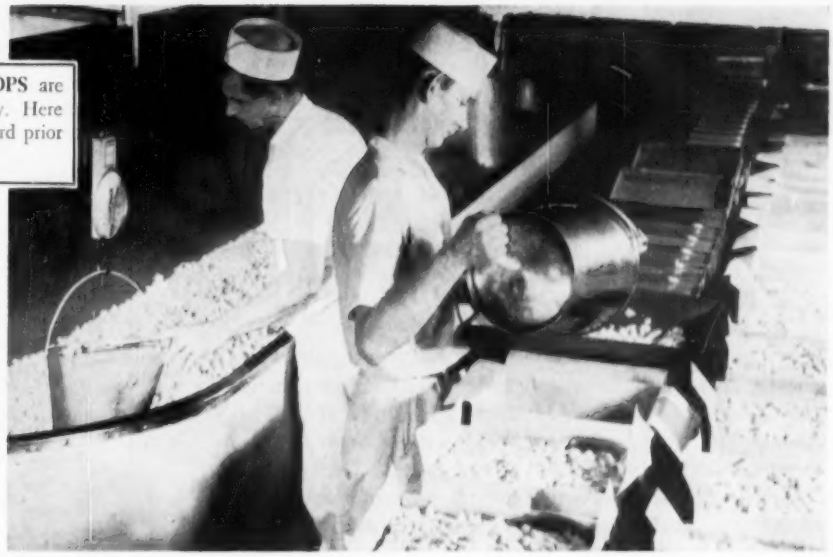

STAINLESS STEEL HOOPS are big aid to control of quality. Here they are being filled with curd prior to the first pressing.

Making Top Quality

RAW-MILK CHEDDAR

Checks that begin at the farm, and extend all the way to the consumer, guard against entry of trouble makers, assure full flavored cheese

ARTHUR V. GEMMILL
Senior Associate Editor, "Food Engineering"

CAREFUL CONTROL of quality —from the time milk is produced on the farm until the cheese, into which it is made, reaches the ultimate consumer.

► **That's the story behind the highly acceptable New York cheddar cheese made by Daitch Crystal Dairies, Inc., and sold through its affiliate Daitch-Shopwell Supermarkets.**

Product is made from unpasteurized, New York City approved milk at the company's Fort Plain, N. Y., plant. Here, the most modern equipment and sanitation practices are employed.

But this alone cannot insure day-by-day high quality. Unless the most rigid sanitary practices are carried out on the farms, problems will arise that cannot be overcome in the plant.

During the last few years, presence of antibiotics in the milk supply have plagued all cheesemakers. For even traces of these substances will prevent milk from setting.

When raw milk is used, further hazards are introduced. These result from presence of microorganisms that are easily killed by pasteurization. Most bothersome are gas-forming bacteria that produce off-flavors and an objectionable open body in the cheese.

However, raw milk produces a cheese with flavor characteristics that cannot readily be duplicated with pasteurized milk. And Daitch does it consistently by going right to the farm with its field men.

These farm inspections supplement receiving "deck" inspections (made on each can of milk in the plant receiving room) and regular bacterial plate counts.

But no quick test was available for determining the presence of antibiotics in milk. So the company developed its own—a laboratory cheesemaking procedure, which is applied to each 4,000-gal. storage tank of milk. Here's how it's performed:

A small sample is removed from the filled tank and placed in a Mason jar. Sample is then warmed to setting temperature (86-88F.), inoculated with cheese culture, and the proper amount of rennet added. When the curd has set, it is cut with a spatula and heated at the same rate the curd would be "cooked" in the cheese vat.

Acidity tests are run on the whey and, if the acid does not develop satisfactorily it is assumed that antibiotics are involved. In this case provision is made to divert the tank of milk to other uses.

If acidity development is normal, the laboratory OK's the milk in the particular tank for cheese making.

In-Plant Procedures

Within the plant, definite quality control and operating procedures

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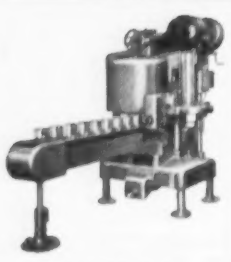

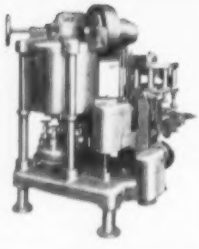

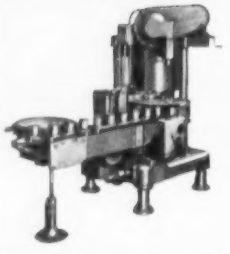

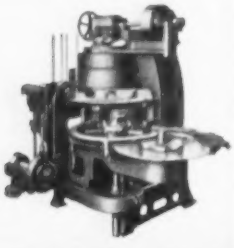

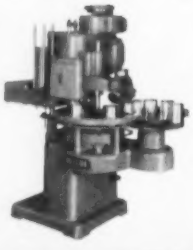

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Sanitary Can Machine Company

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have been established to assure ultimate quality of the cheese.

An outstanding development along this line was the shift, within the last two years, from the usual round paraffined cheddars to 40-lb. rindless blocks.

When first considered, company executives were concerned as to whether raw milk cheddar would ripen satisfactorily, and without mold formation, when cured in a plastic wrapper.

Accordingly, experiments were conducted in which some rindless cheeses were held as long as 21 months at 36F. Results indicated that, with proper sanitary handling and control, the rindless product will cure fully as well as the old style cheese, and that mold rarely develops. An added advantage was the elimination of weight loss that normally occurred during aging.

When mold was encountered, it was traced to a pin hole in the wrapper. Also, the mold did not seem to penetrate the cheese and could easily be removed from the surface with a spatula.

In preparation of the rindless cheeses, special rectangular stainless steel hoops are employed (see lead photo). These are lined with muslin, filled with curd, and pressed for about one hour. Then the "loaves" are removed, "dressed" to eliminate all wrinkles from the muslin, and replaced in the hoops. Hoops are returned to the press, where maximum pressure is continuously applied for 12 hr.

Following this pressing, loaves are removed from the hoop, stripped of the muslin cloths, and carefully wrapped in sheets of aluminum-laminated Parakote (Marathon Corp.). They are then packed in wood pressure boxes and placed in the 36F. curing room for a few weeks. Boxes are then transferred to commercial storage, where the cheeses are aged at 34-36F. Some are removed after 90 days and sold as "mild" cheddar. The remainder are held for at least one year to develop their full flavor.

About two weeks after they are placed in the plant curing room, the cheeses are graded for quality. And, if no defects are found, they are not checked again until they are removed from the commercial storage.

From here the loaves go directly to various supermarkets where, for retailing, they are cut into wedges, weighed, wrapped in transparent film, and the film heat-sealed. —*End*

New from Standard Oil

RYKON

GREASE

Standard scores major breakthrough in grease technology to bring you better lubrication . . . help you make important savings in grease use, application and inventorying.

Scientists at Standard Oil have developed a new non-soap, organic, grease thickening agent. This, plus other improvements in grease formulation, is now available in a new line of Standard greases named RYKON.

Mechanical stability—RYKON Greases show little change in consistency even under severe working.

Oxidation stability—Exclusive thickener in RYKON Greases inhibits oxygen absorption. This prevents costly corrosive action on bearings.

Water resistance—Extremely resistant to water washout.

High temperature stability—RYKON Greases have an ASTM dropping point of 480° F. They have exceptional heat stability.

Resistance to change—RYKON Greases remain soft and grease-like at sustained high temperatures, continue to give thorough lubrication.

Low temperature stability—RYKON Greases work readily at low temperatures, lubricate from a cold start.

Oil separation—RYKON Greases exhibit strong resistance to bleeding.

Rust preventive properties—RYKON Greases demonstrate superior natural qualities in prevention of rust.

To meet specific grease lubrication problems, greases in four Regular and three Heavy Duty grades are available. With a single RYKON multi-purpose grease doing all jobs in the plant, there's no wrong grease to use. Money invested in grease inventories is cut, storage and application facilities are reduced. Maintenance training is simplified.

Get the facts about RYKON Greases from the industrial lubrication specialist at the Standard Oil office nearest you in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

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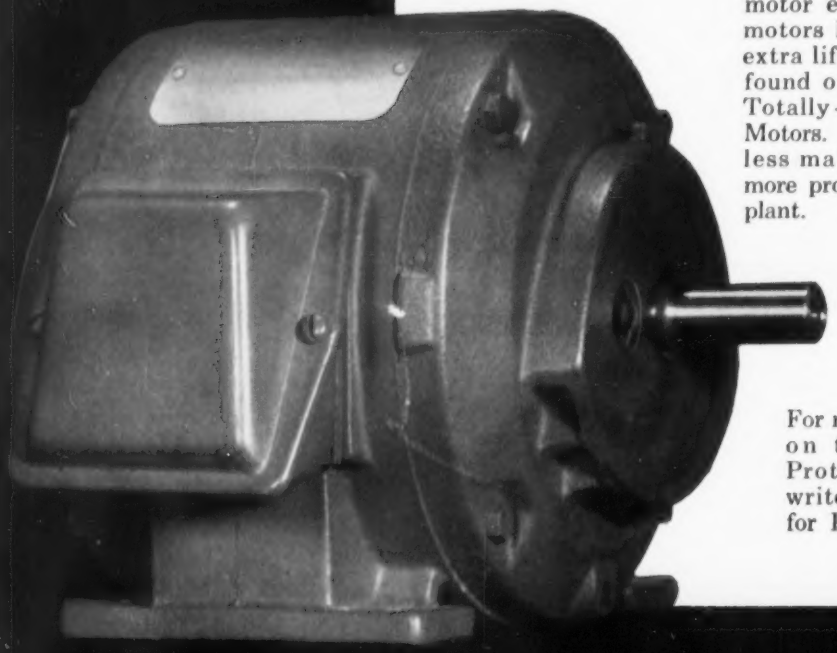
This Totally-Protected concept brings you a new motor efficiency. These motors have a built-in extra life—an extra life found only in Reliance Totally-Protected A-c. Motors. You profit from less maintenance and more production in your plant.



For more information on this Totally-Protected concept, write to Dept. 367A for Bulletin B-2401.

(B-1643)

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AND ENGINEERING COMPANY

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Confusion on Additives Hazard Calls for Basic Appraisal

By cutting through the smoke of controversy to essential fundamentals, a safe and sane amendment to food law could be enacted quickly

RUSSELL S. McBRIDE
Editorial Consultant, "Food Engineering," Washington, D. C.

THERE IS almost unbelievable confusion and controversy in respect to chemical-additives legislation.

Government officials and spokesmen of the food, chemical, cosmetic, plastic, and container industries are all involved. And the variation in opinion among industry groups themselves is as great as the differences between industry and government.

Both the public and the industry may suffer from this confusion. It is important to clearly determine what the consumer needs for protection against occasional hazards from either ignorant or careless enterprise. It is almost equally important to ensure that new and worthwhile results of food research will not be stymied by needless restrictions.

Points of Agreement

Improper "additives" might be dangerous. Their use obviously should be eliminated or restricted within safe limits. This much is agreed to by all.

Industry willingly agrees that *it* must make the tests needed to ensure that "improvements" are actually safe for the public.

Most people feel that Food & Drug Administration is the agency that must ultimately set up whatever controls are needed. How and under what rules are the disputed points involved in the confusion?

Causes of Controversy

There are two causes for the controversy or fear which exists. First, there is demand for "absolute safety," which obviously is wholly impossible. Almost equally feared is the possibility that needless "bureaucratic" domination may become one consequence of new legislation.

Gradually developing is a realization that judgment of the safety of any additive must necessarily be based on the knowledge of many persons. And these persons must have the training and experience that give them clear understanding of all aspects of the problems involved.

Restrictions on novelty must not be so severe as to prevent real progress. To do that would discourage much research and deprive the consumers of many advances which they can reasonably demand.

Public safety and effective progress both *can* be had. Even now, cases of dangerous additive use seem actually unknown. Current warnings and worries are based only on what "might be serious," *none proven.*

It is not easy to define the proper limits that are needed. But the only sound appraisal will be that based on the unfettered judgment of experienced and independent persons, thoroughly acquainted with methods of pretesting and competent to evaluate the results. (This does NOT mean appraisal by a National Research Council advisory committee.)

What Can Congress Do?

Early legislative action is desirable. But drastic or needlessly severe legislation will do more harm than good. Congress will not be taking final action in these matters in its first effort. However, it can well take long strides forward along the following simple lines:

1. Industry can well be told by law that it must report to FDA in advance its plans for sale of foods containing new chemical additives. FDA can promptly serve the public only when adequately informed.

2. In support of each such proposal, industry can properly be asked to furnish the supporting evidence which in its judgment shows that the new material is safe under the proposed conditions of use.

3. The safety yardstick to measure hazard to the public should be clearly stated in the law. Congress should make it perfectly clear that the unfettered judgment of competent specialists, and all available facts, must be the basis for determining hazard to public health. Mere administrative judgment is not adequate.

Changes NOT Needed

Even as the food law now stands, the Commissioner can weigh evidence of safety and seek any further information believed necessary.

An adverse finding by him would, as a practical matter, effectively eliminate new materials if there be any real threat to public health. Several adequate disciplinary procedures already are available.

Without any new law, the Commissioner can reopen any case from time to time as need is found. He also can reappraise old practices which by new knowledge have been made suspect of hazard.

It is to be hoped that Congress will not either attempt now, or later find necessary, long and complicated definitions of procedures or restrictions. None of these can safely be substituted for sincere joint action of officials and industry.

(*Turn to page 200*)

Author Speaks from Experience

Russell S. McBride has been an editorial consultant of FOOD ENGINEERING since the founding of the magazine.

He also is a consulting chemical engineer serving numerous large food and chemical firms from Washington. So in this article he views the additives situation in the light of many years of intimate association with the problem.

The suggestions of the article are not offered by him, or by us, as a panacea for all present ills. But the article states the real problem, and it discusses an immediate palliative that might well be a satisfactory long-time remedy.—The Editors.

"Another product safely shipped in Inland 'protection-ered' containers"*

Old Ali Baba never had it so good!

The modern Caravan Products Company of Passaic, New Jersey, producers of TO-TO, a sweet dough base for bakers, doesn't ship by camel. They do, however, provide complete protection for their product, regardless of how it is shipped, with the best shipping container for the job . . . an Inland "protection-ered" pail.

TO-TO contains such ingredients as sugar, shortening, egg solids, flavorings. The baker simply adds flour, yeast and water to make the sweet doughs for his products. Problem was packaging TO-TO so that it would be delivered to bakers fresh, sweet, and positively uncontaminated. Inland solved the problem with a special sanitary pail lining which ships TO-TO as flavor-true and wholesome as the moment it was made.

Lithographing the outside of these sturdy shipping containers in an attractive design and brilliant colors, also solved the problem of brand-name identification, adding distinction and new sales appeal to the product.

If you have a product that requires special protection during shipment, Inland lined containers may be the answer to *your* problems. Learn too, how Inland's complete lithography and design service can *help sell* your product. Write Bob Boecher, Dept. 337G.

**the right container, with the right lining for your product*

INLAND STEEL CONTAINER COMPANY Division of Inland Steel Company · 6532 South Menard Avenue, Chicago 38, Illinois · Plants: Chicago · Jersey City · New Orleans · Cleveland and Greenville, Ohio. *Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.*

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SERVING INDUSTRY WITH "COLLOIDS OUT OF THE SEA"

SeaKem EXTRACTS

An ADVERTISEMENT by and about SEAPLANT CORPORATION of New Bedford, Mass.

CAN IRISH MOSS BE OF HELP?

Here's an easy way to find out

You now can equip yourself with a rewarding source of information about Irish Moss Extractives. Simply write for a copy of the special Technical Issue of *SeaKem Extracts* that has just come off the presses.

The entire 8 pages of this special issue of our house organ (published under the same masthead as above) is devoted to the latest available technical information about Irish Moss (carrageen) and its extractives (carrageenan)—what they are and how they may be of help.

The article "How to Use SeaKem Stabilizers" discusses amounts to use, how to put into solution, and the formulation of end products — whether dry mixes, liquid, gelled or semi-solid mixes.

Under the heading "Present and Indicated Uses," detailed information is given about these interesting hydrocolloids: uses in gelation, viscous behavior, stabilization of foams, and control of crystal growth.

A full-page table on page 6 of the issue lists the characteristics of 27 SeaKem Stabilizers: water viscosity, water gel strength, milk suspending strength, milk gelling strength, and emulsion stabilizing ability—as well as typical uses for each type.

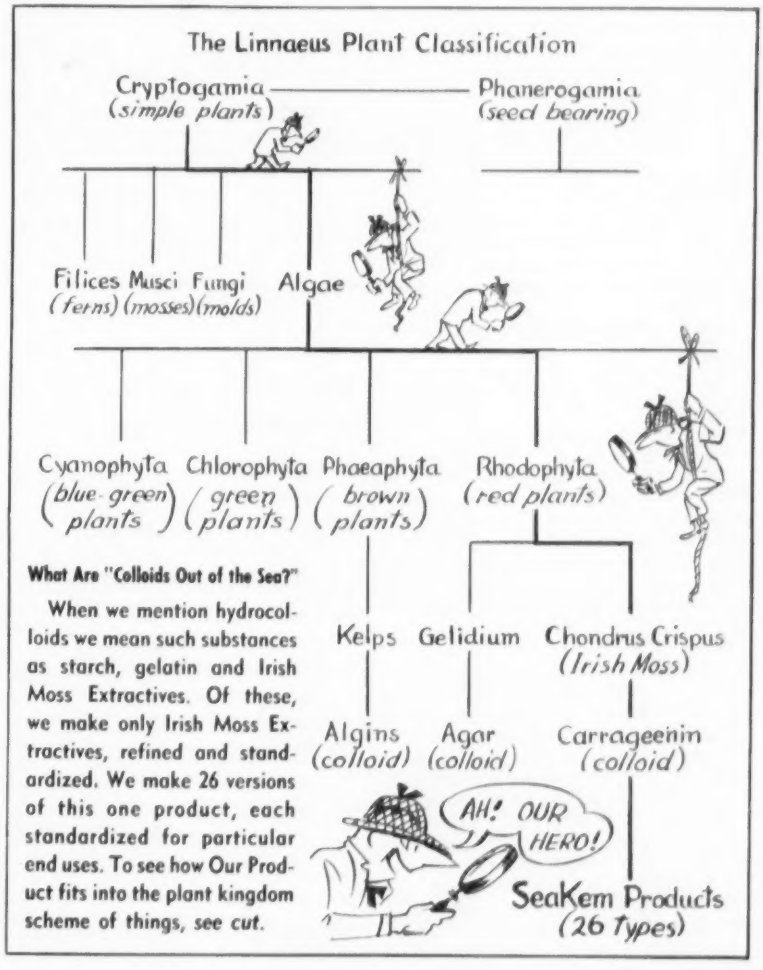
Carrageenan is unique in its ability to alter the degree of agglomeration of the casein particles in milk at low concentration. The article "Usefulness in Milk Systems" tells about the three types of SeaKem Stabilizers most useful in milk under varying conditions, including information on mixing procedures.

The plants in which carrageenan occurs as the principal intercellular substance are among the most simple in the evolutionary scale—are the antecedents of higher plants and animals. "Physiological Reactions" briefly discusses the taste sensation affectation and other unusual attributes of carrageenan. "Modification of Carrageenan Structure" points out that, like all polysaccharides, carrageenan can be altered by hydrolytic, oxidation or reduction reactions.

"Complexes with other Polymers" lists a number of complexes and polymers with which noticeable changes have been observed, and the nature of

Usefulness in Milk Systems

Turn the page for an excerpt from the special Technical Issue of SeaKem Extracts which tells the story about the Usefulness of Irish Moss Extractives in Milk Systems.



What Are "Colloids Out of the Sea?"

When we mention hydrocolloids we mean such substances as starch, gelatin and Irish Moss Extractives. Of these, we make only Irish Moss Extractives, refined and standardized. We make 26 versions of this one product, each standardized for particular end uses. To see how Our Product fits into the plant kingdom scheme of things, see cut.

CUT AND FILE

CONTINUED

SeaKem EXTRACTS An ADVERTISEMENT by and about SEAPLANT CORPORATION

CONTINUED

these changes. Also included are discussions of the plant and chemical classification and molecular structure of SeaKem Stabilizers, as well as a glossary of seaplant terms.

You will find much information of value in this issue of our house organ—although the best way to secure help in solving individual stabilizing problems may be to write directly to Seaplant Corporation. For special application information, *or the special Technical Issue of SeaKem Extracts,* use the coupon below.

Usefulness in Milk Systems

Carrageenan is unique in its ability to alter the degree of agglomeration of the casein particles in milk at low concentration. Of other hydrocolloids, only quince seed mucilage appears to have this ability. The dispersion of the casein is controlled, among other factors, by the proteins in the milk serum. Since the carrageenan is not found associated with the casein, present theory is that the carrageenan exerts its influence through association with the serum proteins.

Two carrageenan types are available. SeaKem Type 2 (Hot Process Chocolate Milk Stabilizer) is the standard for milk which is to be pasteurized. Given a standard carrageenan, the amount of casein modification is a function of the concentration in solution. The heating is, however, only a triggering preliminary step, since the change in agglomeration and the ability to suspend cocoa does not occur until the milk has been cooled, to 50°F. or lower.

SeaKem Type 7 (Cold Process Chocolate Milk Stabilizer) is the standard for use directly with cold milk.

Since the casein aggregates are of fairly large size, even on slight modification, they can be altered by very vigorous mechanical agitation. High speed agitators and pumps, turbulent flow in pipes and sharp bends at high flow rates can produce a significant change and destroy the cocoa suspending properties of the system. Major changes are produced by such high shear rate devices as homogenizers and colloid mills.

The altered casein aggregates have many valuable properties depending upon the degree of modification. With slight change (approximate concentration of Type 2, 0.035% and Type 7, 0.050% in suspending cocoa in chocolate milk) the rheological characteristics are altered to produce stable emulsions and suspensions and change mouth feel. With greater modification, the separation of curd and whey is facilitated until a concentration is reached where the casein forms a continuous gel structure, which can supplement the gel structure produced by the carrageenan in the serum. For example, 0.2% of SeaKem Type 10 will produce firm milk gels.

Low Calorie *and* Pure

Many people ask us about the value and wholesomeness of Our Product for human consumption. Like any other edible product of the sea, it's as good as God and Nature have made it.

With regard to food value, in the amounts used for stabilizing purposes, Irish Moss Extractives add little or no caloric value. This is why manufacturers of low calorie foods have found these stabilizers exceptionally useful.

In the matter of wholesomeness, Irish Moss Extractives are written into the Standards of Identity for such foods as process cheese and french dressing.

New! New! New!

We have just developed a new stabilizer. A unique advantage of this new product is its ability to work well in cold mixes as well as in the presence of heat—a needed characteristic for such products as flavored mixes for home use in making either cold or hot drinks. If you are working on an application where such a stabilizer might be of help, be sure to drop us a line.

did you know?

. . . that SeaKem "Colloids Out of the Sea" are uniquely different both in their reactivity with proteins and their ability to work well "in combination" with other colloidal materials.

. . . that because of their reactivity with milk in any form, soya and egg proteins, very small amounts of a SeaKem Stabilizer often will react with and thus bring into more effective play, naturally-present ingredients, making possible formulation accomplishments and production economies users call "incredible."

. . . that SeaKem Stabilizers can be used as "tool" ingredients "in combination" with other colloidal material (starches, locust bean gum, carboxymethylcellulose, etc.) to build behavior and advantages which cannot be obtained from any one of these ingredients alone.

SEAPLANT CORPORATION

63 David Street, New Bedford, Mass.

Gentlemen:

Please send me the special Technical Issue of *SeaKem Extracts* ☐

Please send me information on the following special application:

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Your Name: .....
(please print)

Firm Name: .....

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FE What It Is–In FOOD ENGINEERING you have the finest publication in its field–the one that has never lost a reader-preference survey. It long has been influential in advancing men and companies in the industry. And it contributes to progress of the field as a whole.

Who It's For–FE is edited for men who direct a food manufacturing business, or are in charge of an operation or function in this field–men like you. It works for all–from president to department supervisor.

What It Covers–Progress in all phases of manufacturing is covered in FE. Pages are devoted to Management, Processing, Packaging, Plant Engineering, Sanitation, Quality Control, Ingredients, Instruments, Materials Handling, Transportation, Maintenance, and Personnel.

What to Do With It–You get no value from any tool unless you use it properly. FE is no exception. It won't do you much good as a paperweight. Nor is it intended as a decoration on your desk, though it might impress your boss to see it there.

No, you have to read it regularly. In so doing you discover ideas and information that will help you do a better job.

That you may get the most out of FE–in the least time–we give you 14 tips on how to use this valuable tool.–The Editors.

How to Use FOOD ENGINEERING

TIP 1–Start Reading Now

To delay is to let opportunity pass. FOOD ENGINEERING is timely. Its articles and short department items are news about progress. The quicker you pick up the new ideas and information, the quicker, they will pay off for you. If you don't read it promptly, one of your more eager associates may beat you to it. Or worse, a competitor will get the jump on your company.

It can cost you personal prestige–and cost your company money–if you don't take advantage of your current issue of FE now.

TIP 2–Take a Quick Look Inside

See what's in the package as soon as you receive it. Turn to the contents page just inside the cover. Read the feature titles and the elaboration under each.

Don't overlook the departments listed on the second contents page. These are just as valuable as the features.

TIP 3–Thumb Through the Issue

Before you put FE down, turn through the pages from cover to cover and see what's on each. You get the main idea at a glance. And the features give you the story in a nutshell in the first two or three paragraphs–in seconds.

As you turn the pages, bookmark the high-interest spots with little slips of notebook paper–or write the page numbers on the cover or contents page. Then you can quickly come back to them for thorough reading.

If you don't thumb through the pages to absorb at a glance the significance of each headline and illustration, you are certain to miss many a good idea and many a chance for doing your job better.

TIP 4–Take a Broad View

You will get the most from FE by reading about the unit operations and functions with which you are concerned–whatever branch of the industry they are from.

That is why FE is so valuable. It brings you new ideas, better methods, and technical advances from the entire food industry.

From it you tap progress in a wide area–in management, processing, packaging, plant engineering, sani-

tation, quality control, products, ingredients, instruments, materials, handling, transportation, maintenance, and personnel.

TIP 5—Extend Your Range

Don't limit your reading to your specialty. To do so is to impede your personal progress, as well as your immediate value on the job.

Top positions in food manufacturing call for a broad-gage man. He needs to know all phases of plant operations, and understand the technology involved. And he must be wise in management methods and personnel techniques.

Even a specialized job cannot be done well in isolation. What you do is interrelated with other types of operations and functions in the business. And it will pay you to familiarize yourself with those.

TIP 6—Latch Onto Ideas

They say the world is lousy with lousy ideas. But a good idea can be worth a fortune. Every issue of FE brings you many ideas. And they're good ones because some one has proved them out in practice.

Just one of these good ideas is worth many many times the price of your subscription to FE. So comb the magazine thoroughly for this value.

And consider how you can adapt techniques that may not fit your purposes as is. Think how you can make the basic concept pay off for you.

This is a fast road to progress, and a sure way to outdistance conventional competitors.

TIP 7—Dream a Little

If you do a bit of imagineering after you expose your mind to the new as you read, then you'll get a chain-reaction value from FE. One idea will set up a train of thought that will inspire others. That makes you ingenious—if not a genius.

TIP 8—Note 'Why' as Well as 'How'

You have to absorb more about a new idea than just how it works. You must note why it is good—in terms of the benefits that stem from its application. Only then will you know whether it is for you. Only then can you sell it to your associates and put it to work.

TIP 9—Reader Service Can Help

You will want copies of certain catalogs and bulletins described in Just Off the Press. They can help you in selecting better machines, materials, and supplies.

Occasionally you will need special information on a new machine or material described in New Equipment & Supplies—or in an FE show report.

Then, too, you frequently may need more details than are presented in an advertisement.

For your convenience in obtaining such literature and additional information, FE gives you Reader Service. Just circle the appropriate key numbers on the card, then tear it out and mail it.

TIP 10—Clip and File Pages

If you are keeping a file of ideas and information on certain subjects, you can bolster the value of that file significantly by clipping article or department pages from FE. A file of Practical Ideas, Questions & Answers, and New Equipment & Supplies would be particularly valuable.

TIP 11—Or Keep Your Issues

Many prefer to keep FE intact and build a valuable reference library with the issues. For those, an annual index of editorial items is published in the December issue.

If you want to know how valuable back issues can be, try to get one from a consulting food engineer or technologist. When they have a problem to solve, they look for ideas and information in those issues before they make another move.

TIP 12—Write to Editors

You can get more out of FE if you are a participating reader. Tell the editors about your problems. They may have an answer, or a tip that will lead to the answer. And your problem may suggest an article that would be particularly helpful to you.

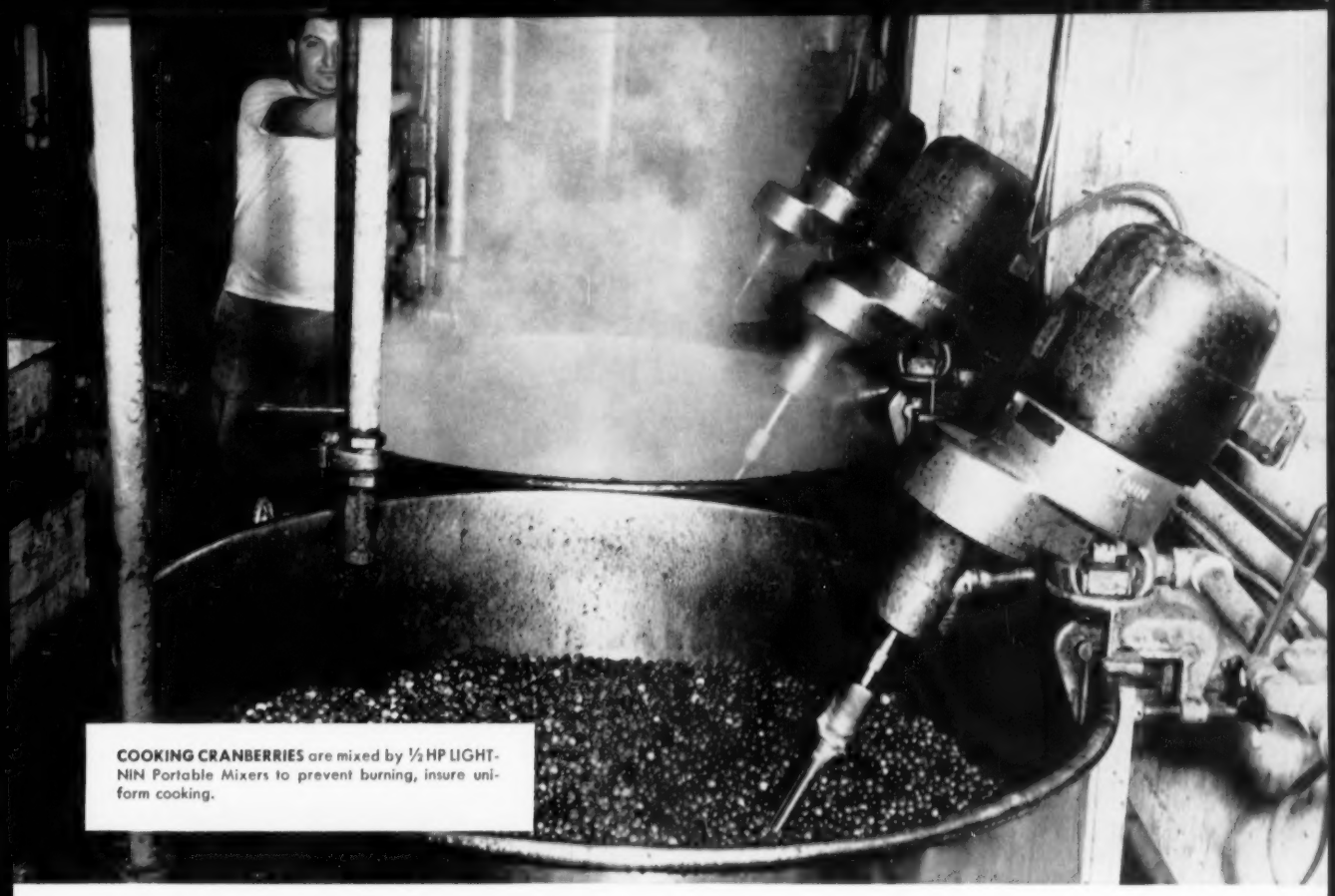
What's more, you can extend your influence and enhance your prestige by commenting on FE articles or industry problems in FE's Letters to the Editor.

TIP 13—Read Departments

Feature articles look more impressive than the short-item departments. But those departments in FE are packed with valuable information of many kinds—on trends, advances in packaging, technical developments, answers to questions, legislation and regulations, practical ideas, books and literature, personalities, and food company news. Every department in FE has a high readership rating.

TIP 14—Don't Skip the Ads

You well know the value of expositions of food equipment, ingredients, and materials. The advertisements in every issue of FE constitute an exposition-in-print. They keep you up to date on cost-cutting, quality-improving machines, devices, containers, packaging materials, ingredients, and services. These are the prime movers of progress.



COOKING CRANBERRIES are mixed by ½ HP LIGHTNIN Portable Mixers to prevent burning, insure uniform cooking.

How to increase the productivity of your **smaller** *mixing operations*

Whenever you work with huge batches or continuous processes, you study mixing scientifically. It pays.

Many times you can profit as much—perhaps even more—by applying sound mixing procedures to your *smaller* mixing operations.

Easy to use

You can streamline any fluid mixing job with LIGHTNIN Mixers. You can gain higher product quality and greater productivity.

All you do is clamp the right LIGHTNIN Portable Mixers in place and turn them on.

They're easy to keep clean—stainless steel shaft and propellers are the only parts that touch what you're mixing. And they just keep on running—hundreds have been in service 20 years or more.

Mix any fluid in any vessel

You can mix anything—as long as it's fluid—with a LIGHTNIN Mixer—in any kind of open or closed vessel.

When our engineers recommend a LIGHTNIN for your product, you are guaranteed exactly the mixing action you want—or your money back.

Let us help you streamline your fluid mixing—in *any* size operation, batch or continuous. For a guaranteed recommendation, get in touch with your LIGHTNIN representative (listed in Thomas' Register). Or write us direct.

Lightnin® Mixers

MIXCO fluid mixing specialists

THINKING BIG? You can get LIGHTNIN Mixers in any size up to 500 HP. This 25 HP turbine-type LIGHTNIN mixes a 25,000-lb. batch of caramel. Right power-speed combination is selected from hundreds of "possibles," using stock components.

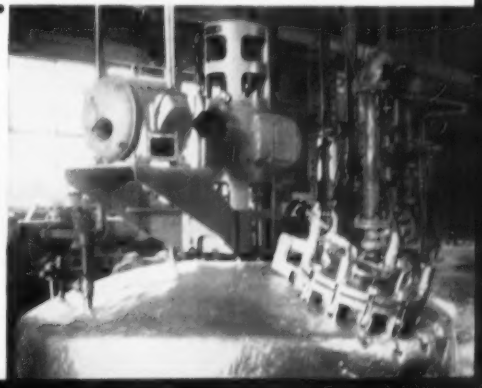
WHAT SIZE AND TYPE of mixer do you need? Check here for latest bulletins giving full description, packed with helpful facts on mixing:

- ☐ Turbine, paddle, propeller types; top or bottom entering: 1 to 500 HP (B-102)
- ☐ Propeller types; top entering: ¼ to 3 HP (B-103)
- ☐ Portable: ⅛ to 3 HP (B-108)
- ☐ Side entering: 1 to 25 HP (B-104)
- ☐ Laboratory and small-batch production types (B-112)
- ☐ Condensed catalog showing all types (B-109)
- ☐ Quick-change rotary mechanical seals for pressure and vacuum mixing (B-111)
- ☐ Data sheet for figuring mixer requirements (B-107)

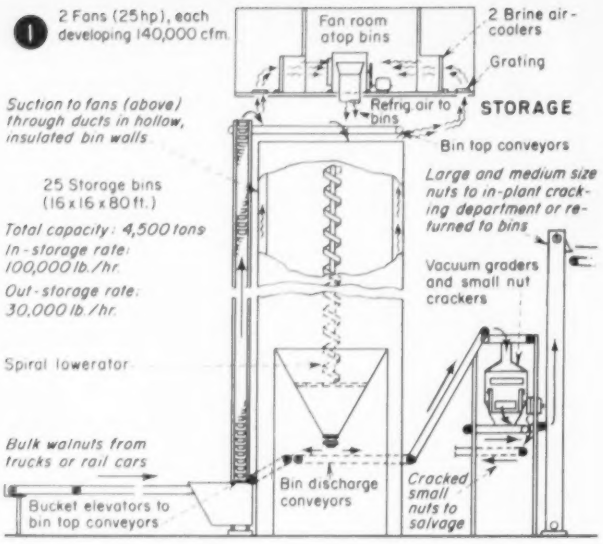
Check, clip, and mail with your name, title, company address to:

MIXING EQUIPMENT Co., Inc., 143-f Mt. Read Blvd., Rochester 11, N.Y.

In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Ave., Toronto 10, Ont.



1 **PERFORATED DUCTS** circulate air from hollow storage-bin walls through brine coils to maintain correct product temperature.


1
2 Fans (25 hp), each developing 140,000 cfm.
Fan room atop bins
2 Brine air-coolers
Grating
Suction to fans (above) through ducts in hollow, insulated bin walls
Refrig air to bins
STORAGE
Bin top conveyors
25 Storage bins (16 x 16 x 80 ft.)
Total capacity: 4,500 tons
In-storage rate: 100,000 lb./hr.
Out-storage rate: 30,000 lb./hr.
Large and medium size nuts to in-plant cracking department or returned to bins
Vacuum graders and small nut crackers
Spiral lowerator
Bulk walnuts from trucks or rail cars
Bucket elevators to bin top conveyors
Bin discharge conveyors
Cracked small nuts to salvage

Streamlined Processing of Nut Meats

Automatic handling plus unique graders cut cost of packaging walnuts

INGENIOUS PROCESS DESIGN coupled with top-efficient materials handling mark the new, multi-million-dollar plant of Diamond Walnut Growers, Inc., Stockton, Calif.

Here, walnuts that fall below the quality required for in-shell packaging (plus some merchantable walnuts not needed for in-shell sales) are cracked out, graded, and packaged with the very latest high-speed machinery.

Nuts for the operation are received in bulk rail-car or truck shipments, and are stored in huge bins—Point 1 on accompanying foldout flowsheet. From here, they move by overhead conveyors to the cracking department—Point 2—where both company-built and Hayes crackers are used to break the shells without damaging the meat. Scalpers separate meat from nuts.

Material that drops through the scalpers falls into rotating, spiral-type size graders. From here, small nut meats and shell pieces drop onto one conveyor and

FOR OUR SPECIAL FE PLANT REPORT on this advanced operation, see p. 64.

are moved to shaker-separators. Larger pieces are discharged on another conveyor and are routed to company-built air separators—Point 3. Uncracked stock falls on another conveyor and passes to re-crackers (Dragon).

Cracked stock from the latter is size-graded in additional scalpers and spiral graders. The fines are conveyed to shaker separators—while the remainder, according to its size, is moved to air separation or returned through the Dragons for recracking.

A four-step separating procedure is followed: Primary and secondary air-separation, shaker grading, and an Armstrong process—Point 3a in plan view.

Vibrators feed stock evenly from cracking department conveyors to triple-duct air separators. In these units, nut meats cascade across three screens, then are discharged into the single-duct machines.

Nut meats fall onto a spiral-screw size grader and are divided into two sizes, essentially halves and pieces. Shell and fiber, which still contains a percentage of meat, is automatically dumped from cyclones on a conveyor that discharges upon the shaker screens.

Three sizes of material result from this latter separation. The two larger sizes may all be routed by conveyor to the Armstrong process, or may be divided between the Armstrong and secondary air separators.

Fiber and shell, the third size, are air-conveyed through an oil mill, and are finally burned in the plant boiler.

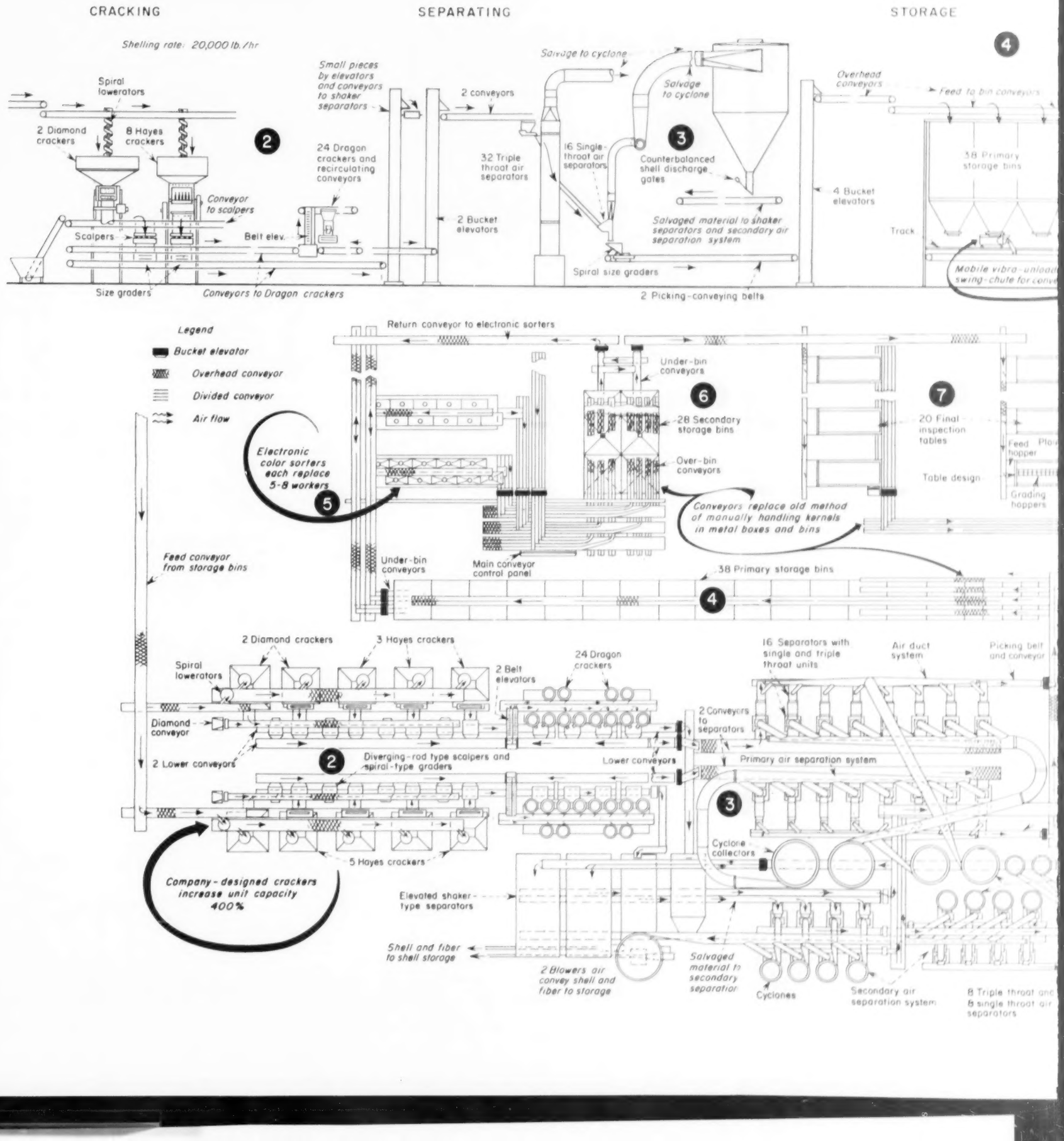
All nut meats, identified by grade and lot, are routed by overhead conveyors to separate, primary storage bins (4). Slide gates, at the tip of the conically shaped bin bottoms, are opened to discharge meats onto one of two conveyors.

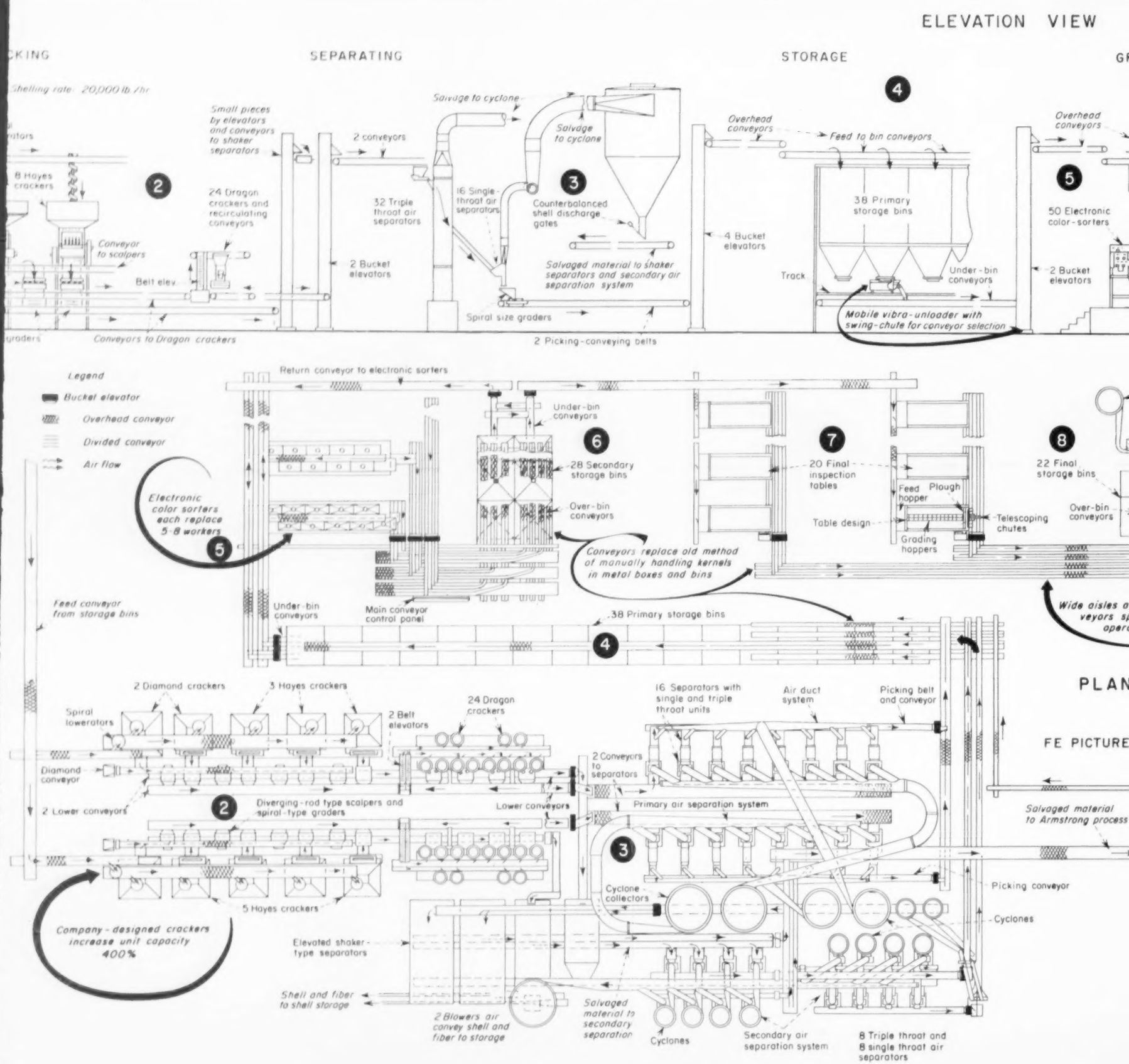
These carriers (16-in.) are each separated into two channels by fixed, galvanized-metal partitions. Bucket elevators, similarly divided, discharge product into a divided, overhead belt that feeds the electronic, color-sorting machines (5).

Each color-sorter handles nut meats at 90-175 lb. per hr. These sorters accept products within a narrow, fixed color range and reject all others. Thus, if the unit is set for selecting top-quality meats, the photoelectric device accepts meats of this color and chutes them to straight-through conveyors and elevators. Nut meats of other shades are chuted to conveyors and elevators that whisk them into secondary storage bins (6).

From color sorting, nut meats move by overhead conveyors to manual inspection tables (7). Here again, after sorting, the finally graded meats are chuted to specific conveyor channels, and are moved to final storage bins (8).

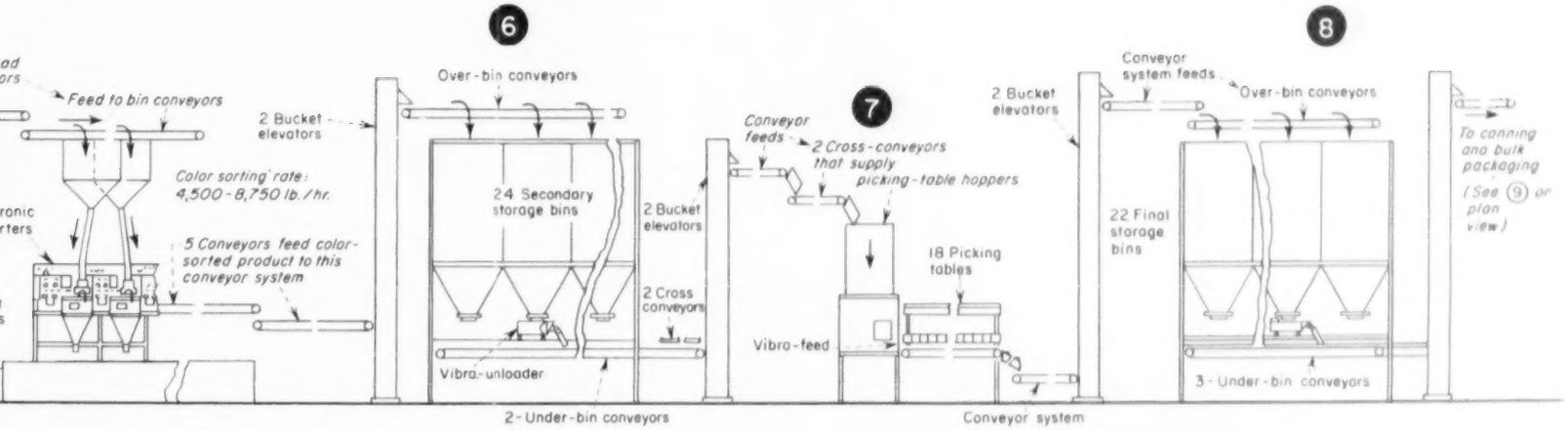
In the final processing step, nut meats pass through a bank of air separators, then are chuted to can or bulk packaging lines (9).

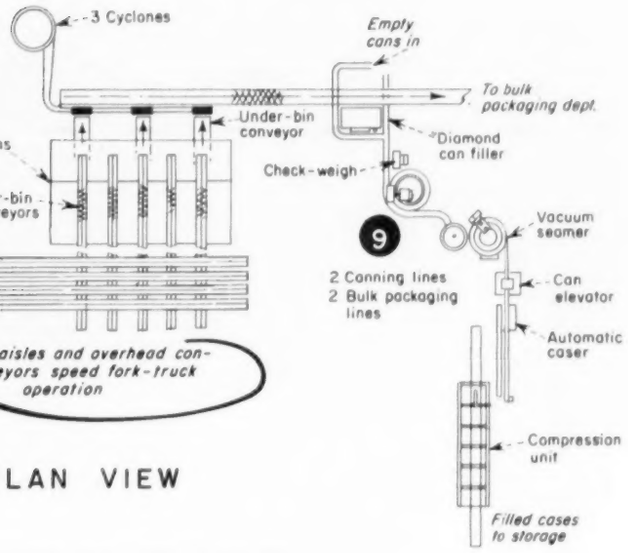

CRACKING
SEPARATING
STORAGE
Shelling rate: 20,000 lb./hr
Spiral lowerators
2 Diamond crackers
8 Hayes crackers
2
Conveyor to scalpers
Scalpers
Belt elev.
Size graders
Conveyors to Dragon crackers
Small pieces by elevators and conveyors to shaker separators
24 Dragon crackers and recirculating conveyors
2 conveyors
32 Triple throat air separators
2 Bucket elevators
Salvage to cyclone
Salvage to cyclone
16 Single-throat air separators
3
Counterbalanced shell discharge gates
Salvaged material to shaker separators and secondary air separation system
Spiral size graders
2 Picking-conveying belts
Overhead conveyors
Feed to bin conveyors
4
38 Primary storage bins
4 Bucket elevators
Track
Mobile vibra-unload swing-chute for conve
Legend
Bucket elevator
Overhead conveyor
Divided conveyor
Air flow
Return conveyor to electronic sorters
Under-bin conveyors
6
28 Secondary storage bins
Over-bin conveyors
7
20 Final inspection tables
Table design
Feed Plow hopper
Grading hoppers
Electronic color sorters each replace 5-8 workers
5
Conveyors replace old method of manually handling kernels in metal boxes and bins
Feed conveyor from storage bins
Under-bin conveyors
Main conveyor control panel
38 Primary storage bins
4
2 Diamond crackers
3 Hayes crackers
Spiral lowerators
2 Belt elevators
24 Dragon crackers
16 Separators with single and triple throat units
Air duct system
Picking belt and conveyor
Diamond conveyor
2 Lower conveyors
2
Diverging-rod type scalpers and spiral-type graders
2 Conveyors to separators
Lower conveyors
Primary air separation system
3
Cyclone collectors
5 Hayes crackers
Company-designed crackers increase unit capacity 400%
Elevated shaker-type separators
Shell and fiber to shell storage
2 Blowers air convey shell and fiber to storage
Salvaged material to secondary separation
Cyclones
Secondary air separation system
8 Triple throat and 8 single throat air separators


ELEVATION VIEW
CKING
SEPARATING
STORAGE
Shelling rate: 20,000 lb /hr
8 Hayes crackers
24 Dragon crackers and recirculating conveyors
Conveyor to scalpers
Belt elev.
Small pieces by elevators and conveyors to shaker separators
2 conveyors
32 Triple throat air separators
2 Bucket elevators
Salvage to cyclone
Salvage to cyclone
16 Single-throat air separators
Counterbalanced shell discharge gates
Salvaged material to shaker separators and secondary air separation system
Spiral size graders
Conveyors to Dragon crackers
2 Picking-conveying belts
Overhead conveyors
Feed to bin conveyors
38 Primary storage bins
4 Bucket elevators
Track
Under-bin conveyors
Mobile vibra-unloader with swing-chute for conveyor selection
Overhead conveyors
50 Electronic color-sorters
2 Bucket elevators
Legend
Bucket elevator
Overhead conveyor
Divided conveyor
Air flow
Return conveyor to electronic sorters
Under-bin conveyors
28 Secondary storage bins
Over-bin conveyors
Electronic color sorters each replace 5-8 workers
Conveyors replace old method of manually handling kernels in metal boxes and bins
20 Final inspection tables
Feed hopper
Plough
Table design
Grading hoppers
Telescoping chutes
22 Final storage bins
Over-bin conveyors
Feed conveyor from storage bins
Under-bin conveyors
Main conveyor control panel
38 Primary storage bins
PLAN
FE PICTURE
2 Diamond crackers
3 Hayes crackers
Spiral lowerators
2 Belt elevators
24 Dragon crackers
16 Separators with single and triple throat units
Air duct system
Picking belt and conveyor
Diamond conveyor
2 Lower conveyors
Diverging-rod type scalpers and spiral-type graders
2 Conveyors to separators
Lower conveyors
Primary air separation system
Salvaged material to Armstrong process
Picking conveyor
Cyclone collectors
Cyclones
5 Hayes crackers
Company-designed crackers increase unit capacity 400%
Elevated shaker-type separators
Shell and fiber to shell storage
2 Blowers air convey shell and fiber to storage
Salvaged material to secondary separation
Cyclones
Secondary air separation system
8 Triple throat and 8 single throat air separators

W

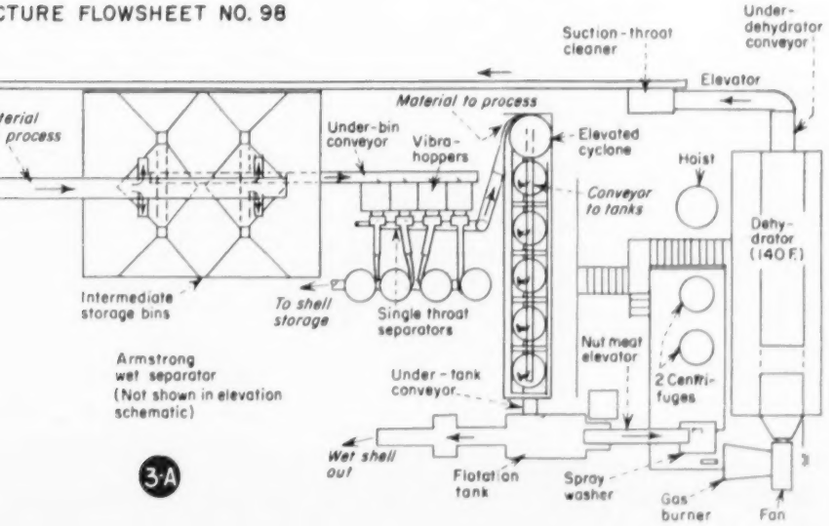
GRADING STORAGE GRADING STORAGE

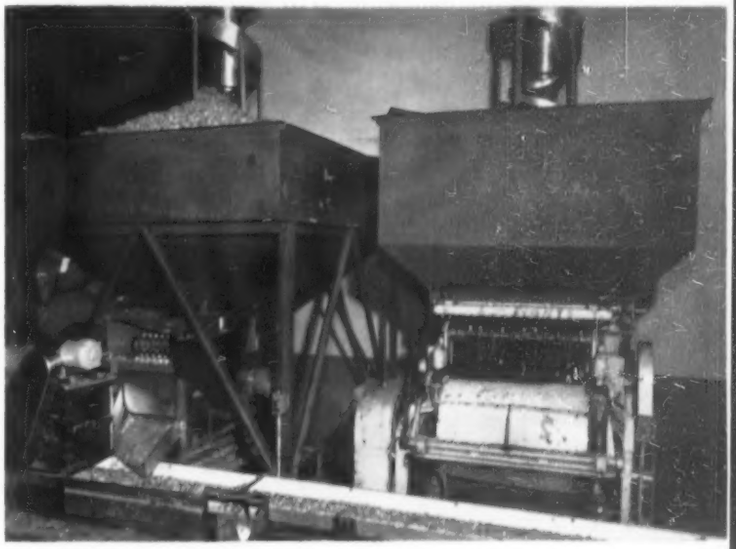




LAN VIEW

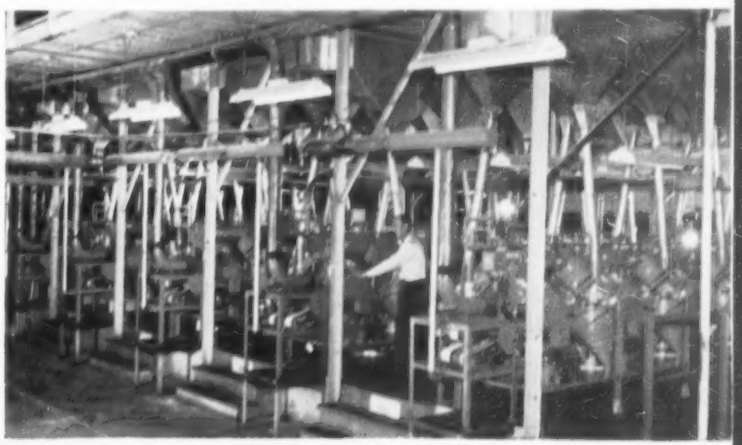
CTURE FLOWSHEET NO. 98

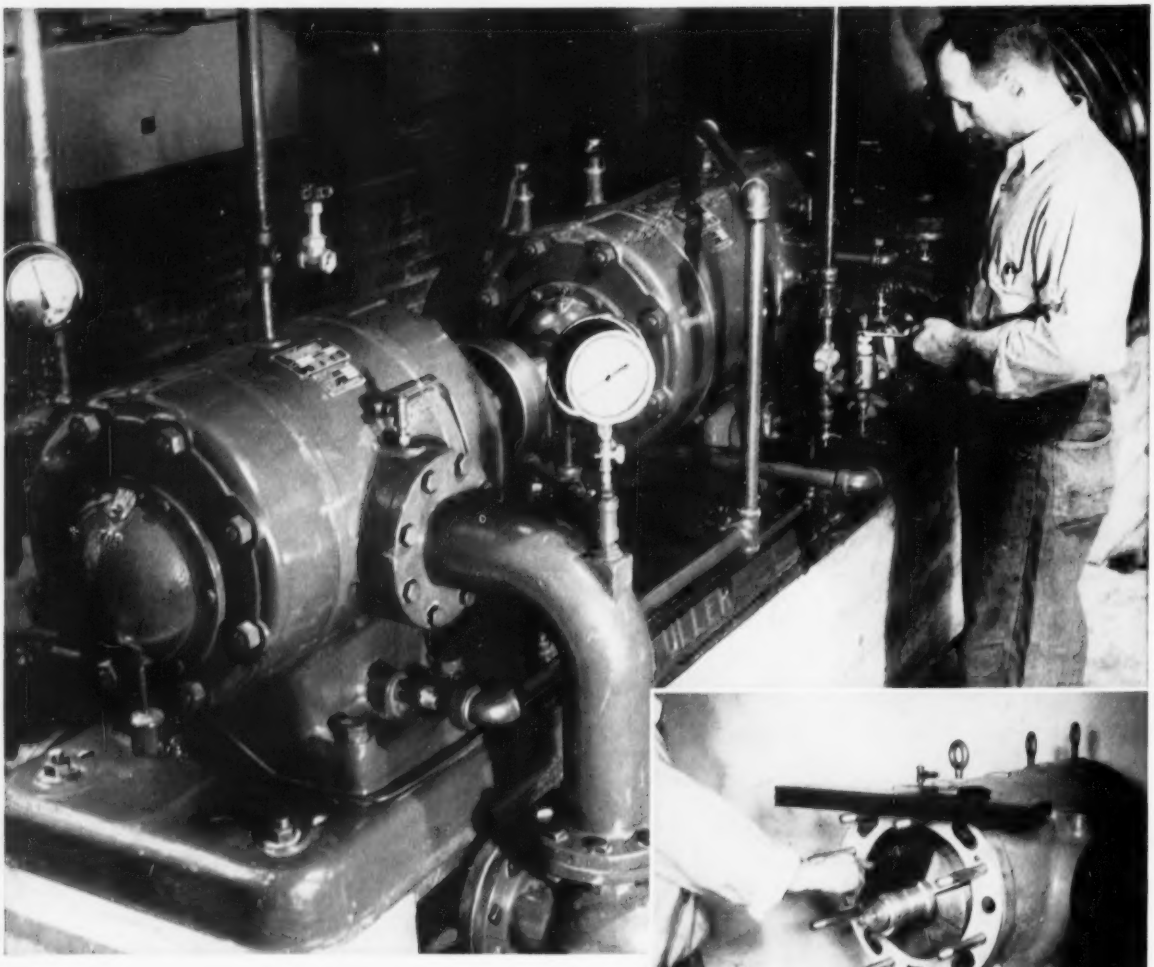




2 WALNUT CRACKERS (company-built unit, left; Hayes machine, right) break shells without injuring meats. Sweeps on conveyor (foreground) divert resultant mixture into spiral separators.

5 FIFTY ELECTRONIC SORTERS handle from 4,500 to 8,750 lb. of nut meats per hour—a job that would take 250-400 manual workers. Machine hoppers are supplied by overhead conveyors. Graded meats are removed by belts located under units.





Blade inspection

PERFECT COMBINATION OF MEN AND MACHINES

Providing plant air for varied uses imposes heavy responsibility on both the compressor and its operator to keep production moving.

The simplicity of the Fuller Rotary Compressor principle reduces maintenance to an absolute minimum; by the same token, operator's universal pride in Fuller Rotary performance contributes to longer life of the compressor. Few moving parts and smooth operation limit the operator's work to periodic inspection.

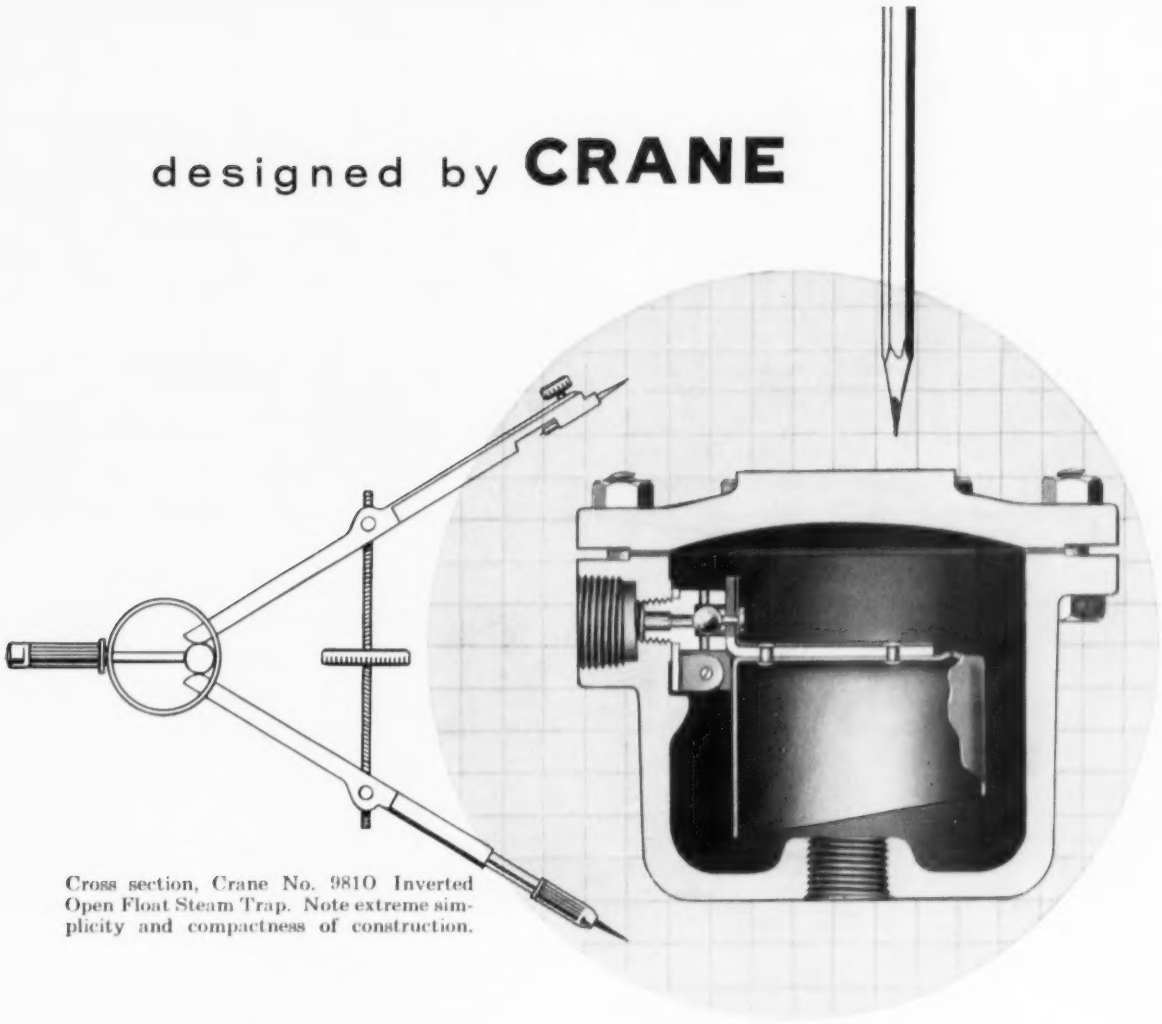
This perfect combination of men and machines is worth investigating, with an eye to economies you, too, can enjoy. Write to Fuller Company, compressor sales department for detailed information.

FULLER COMPANY
114 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham · Chicago · Kansas City · Los Angeles · San Francisco · Seattle

C-316
4686

PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

designed by **CRANE**



Cross section, Crane No. 9810 Inverted Open Float Steam Trap. Note extreme simplicity and compactness of construction.

to keep your steam lines

HOT, DRY and EFFICIENT

With an apparatus heated or operated by steam, you'll save fuel and insure operating efficiency by installing Crane Inverted Open Float Steam Traps—designed to drain condensate accumulation automatically and instantly.

The exceptionally rugged, simple construction of Crane Steam Traps provides high discharge capacities in relation to their size—permitting more compact installations. They are available in working pressures from 1 to 300 pounds saturated steam, sizes ½ to 1 inch.

For literature giving ordering and installation instructions, see your Crane Representative or write to address below.

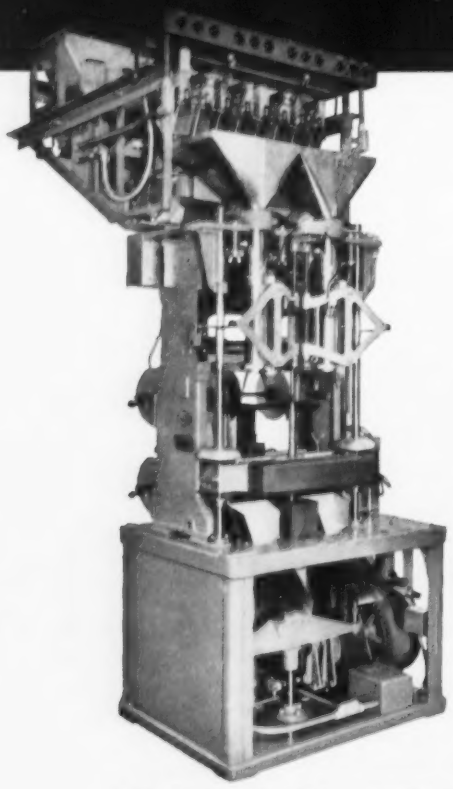
CRANE VALVES & FITTINGS

PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

Now Model B Transwrap Has

SEVEN NEW DESIGN FEATURES



Filled double-wall Planters Peanut bags, with half-hole punched at top, are produced on a volumetric-feed Model B at 100-a-minute speeds.

◀ Model B Transwrap, showing net weight scale feeding.

Here's more news about Transwrap, the *completely automatic* packaging machine. Now you get 7 new design features in the Model B as the result of Package's continuing engineering research and development program.

- **Conjugate Cam Drive**—assures positive up and down drawbar strokes with a mechanism that cannot get out of adjustment.
- **Die Punch for Half Punch-Out**—provides an interrupted cut, makes partial hole without removing the tab.
- **Cam Switch Box**—with half-speed shaft to incorporate all switches in one box.
- **Dielectric Sealing**—with improved construction for sealing heads.
- **Feed and Scale Pans**—new design for more efficient feeding.
- **Magnetic Scale Switches**—replace open points. Feature positive snap action contacts and contamination-proof construction.
- **Improved Augers**—use various pitches to suit product conditions.

Model B Transwrap will produce filled bags in sizes from ⅜" to 5⅛" wide and 2⅛" to 13" long, handles free-flowing solids, liquids, semi-liquids, granules and fine powders. You can find out about all these new Transwrap features by contacting our nearest office today.

PACKAGE MACHINERY COMPANY

EAST LONGMEADOW, MASSACHUSETTS

NEW YORK • PHILADELPHIA • BOSTON • CLEVELAND • CHICAGO • ATLANTA
DALLAS • DENVER • LOS ANGELES • SAN FRANCISCO • SEATTLE • TORONTO

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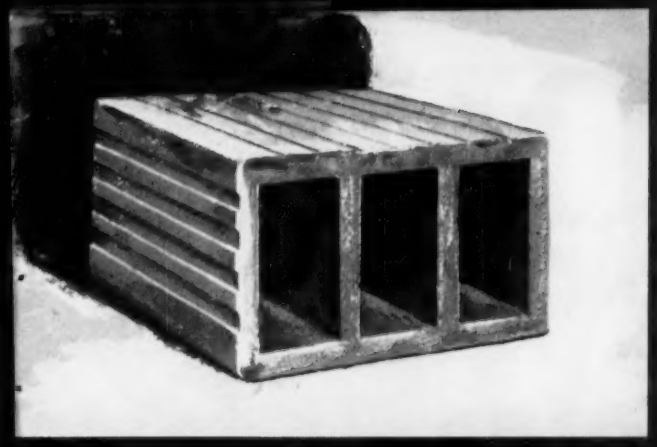
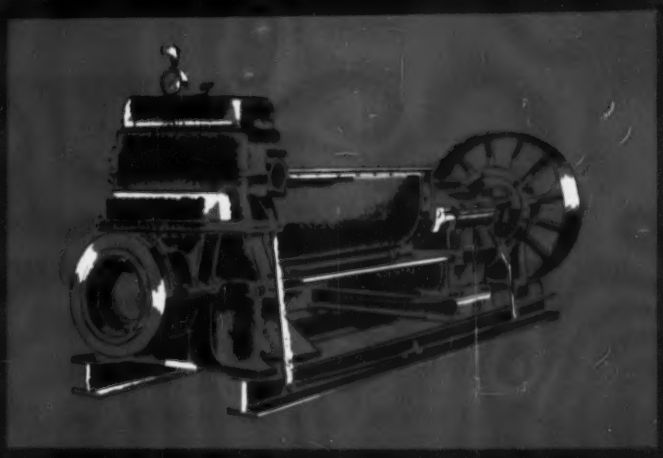




No Margin for Air— No Margin for Error

ANOTHER DRIVE REQUIREMENT MEETS ITS MASTER

Yes, it's a fact—unless you remove the air from the clay, you get a no-good tile. And whether air is your problem, or not—error is always a problem. And it's never a mistake to come to Master for the right power drive. In every kind of industry, Master customized package drives give you the utmost in flexibility, compactness and performance.

Here, the primary requirement is power—and the husky, big 200 H.P. Master fills the bill year in and year out. Your requirements might be better met by integrating Master components into a single, efficient, compact unit for the right horsepower, right shaft speed and right mounting features. What are they?

A husky 200 H.P., 440 volt squirrel cage induction Master Motor powers this 14-ton De-Airing Brick and Tile Machine with a capacity of over 8000 bricks per hour. Two parallel shafts carrying pug knives work clay, pass it into vacuum chamber with auger cylinders where it is finished and discharged.

Motor Ratings	⅛ to 400 H.P. All phases, voltages and frequencies.
Motor Types	Squirrel cage, slip ring, synchronous, repulsion-start induction, capacitor, direct current.
Construction	Open, enclosed, splashproof, fan-cooled, explosion-proof, special purpose.
Speeds	Single-speed, multi-speed, and variable speed.
Installation	Horizontal and vertical, with or without flanges and other features.
Power Drive Features	Electric brakes (2 types)—5 types of gear reduction up to 432 to 1 ratio. Mechanical and electronic variable speed units—fluid drives—every type of mounting.

MASTER

THE MASTER ELECTRIC COMPANY

DAYTON 1, OHIO

CONTOUR-TRENTWELD

welded stainless pipe that's smoother, stronger

New Contour-Trentweld outperforms any other pipe, welded or not. Here's why: *Contour-Welding* is an entirely unique method of producing pipe and tubing. It puts gravity to work to pull down the molten weld metal until it exactly conforms to the contour of the pipe. Result: A smooth pipe or tube free of undercut or bead.

What's more, the *Contour-Weld* process *starts* with uniformly rolled stainless strip, which insures constant wall thickness throughout the pipe.

But the only way you can fully appreciate the advantages of new *Contour-Trentweld* is to try it. We think you'll agree, *it can't be beat by any other pipe, welded or not.*

Why Trent's Exclusive Contour-Welding Process Means Smoother Welds . . .

Normally, in producing welded pipe, the weld is made at the top. But gravity plays a nasty trick. It tugs at the fluid metal in the weld zone, pulling it down toward the middle of the pipe. The result, particularly in the heavier gages, is a perceptible bulge where it hurts the most – right on the I.D. surface. If you try to get rid of the bulge – at fair cost – the metal is undercut – and corrosion and erosion start there.

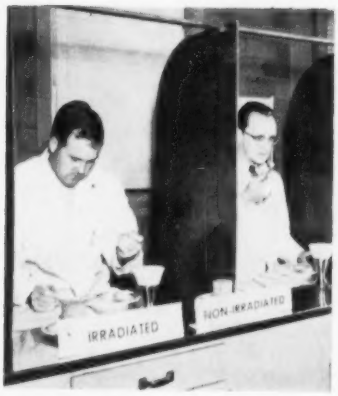
But Trent put a stop to that – simply by going into partnership with gravity. With their exclusive *Contour-Welding* process, they weld at the bottom – and gravity works for them. For then, the bulge is in the opposite direction – blending in perfectly with the contour of the pipe itself.

CONTOUR TRENTWELD

Stainless and High Alloy Welded Tubing

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of Crucible Steel Company of America)

KEEPING UP WITH THE FIELD



Check A-Rayed Meat

Taste testers compare samples of meat preserved by both standard heat treatment and atomic radiation at American Can Co., Maywood, Ill. The researchers report that while large scale commercial production is still some time away, encouraging progress is being made in licking the technical and economic problems that beset the A-ray process.

Defense Pointers for Food Men

Protection of the vital food industry in the event of an enemy attack is the subject of a special USDA publication, *Defense Guides for Commercial Food Facilities* (Bulletin 169).

This new release covers such points as microfilming and safe storage of important process information and patents, plant dispersal, recruitment of workers, fire and sabotage protection, and maintenance of communications.

Decries Broad Insecticides

Possible danger in the use of present broad spectrum insecticides to subdue insect pests has been underscored by the decision of Thompson Chemicals Corp., St. Louis, to withdraw from manufacturing these chemicals.

"The growing number of insect pests that are becoming resistant to these products demonstrates a serious danger in their widescale use", declares W. T. Thompson, company president. "And the imbalance of fauna population caused by destruction of natural predators and parasites can easily cause heretofore unimportant insects to increase to the status of economic pests."

Hard Sell Yields to Soft Touch

Food packaging will eschew the powerful punch for the subtler influence of subdued colors, photographic illustrations, and imagery, according to the Folding Paper Box Assn.

These new trends in packaging thinking are based on an FBPA analysis of the 9,123 entries in its recent 12th annual carton contest.

N. Y. Ok's Gallon Milk Sales

Residents of New York State may soon enjoy their milk in the popular gallon size containers, as a result of a recent bill that removes restrictions on the giant bottles.

New York dairymen—formerly opposed to larger-than-quart units—are solidly behind the measure in the hope that it will stimulate sales of fluid milk.

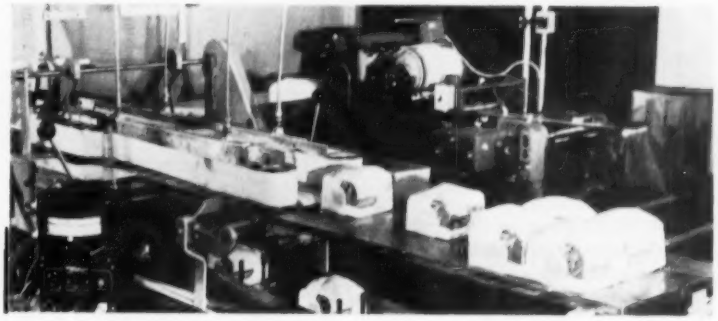
AMI Head Takes Exception To Senate Packers Bill

Fighting a Senate attempt to transfer regulation of the meat packing field from the USDA to the Federal Trade Commission, W. Hardenbergh, president, American Meat Institute declared recently that processing of livestock is more agriculture than trade.

The whole system of marketing and processing livestock, he continued, is integrated and it is impossible to separate one portion and label it agricultural and say the rest is trade.

Refuting other arguments put forward by proponents of the Senate measure, President Hardenbergh asserts that the top ten meat companies do not control 70% of the total meat business, but actually slaughter 39% of the cattle and calves, 60% of the hogs, and 73% of the sheep and lambs.

Denying the charge that big packers are absorbing competition, he points out that in the last 11 years 530 new firms have entered the field. The packing field is subject to antitrust laws at present, he adds, although the lack of convictions proves an absence of illegal activity. The Justice Department does have authority to enforce these laws at present.



Discloses Research on Wrappers

Great promise is seen for new, continuous wrapping machines—designed to make end and under-fold seals in polyethylene film. The units, such as this tray and carton wrapper, are now under development at Bakelite Co., Bound Brook, N. J. New resin formulations—producing stiffer films—and belt-type heat sealers are expected to greatly widen applications for this versatile wrapping material.

Installs Continuous Columns in Expansion Move

To boost production volume of aromatic and flavor chemicals, fifteen continuous distillation columns have been installed at van Ameringen-Haebler, Union Beach, N. J. This equipment, plus addition of other specially designed kettles and machinery, is part of a $1,500,000 expansion program that will permit greater utilization of hydrogenation and distillation processes.

Finds Ray-Resistant Bacteria

Discovery of a radiation-resistant species of bacteria by Oregon State College Researchers may administer a sharp setback to progress in A-ray preservation of foods.

Whereas most organisms are destroyed by 2,000,000 reps. of radiation, this tough micrococcus withstands over 5,000,000 units, and increases the problem of preserving food products without development of off flavors.

The organism, so far termed only the "red micrococcus," grows at refrigeration temperatures and produces proteolytic spoilage in irradiated canned meats. It is very resistant to common sanitizers.

Heat-and-Eats Show Big Jump

Production of frozen prepared foods jumped 60% in '55, according to a marketing research report just released by USDA.

The survey, which covers 173 items, ranges from appetizers and entrees to soups and desserts.

Frozen potato products led the field, with production soaring to over 160,000,000 lb. Meat and poultry items ran second, each of them totalling over 91,000,000 lb. Bakery products hit a 68,000,000-lb. figure—as did fish sticks.

Specialty foods—nationality products and regional dishes—accounted for over 28,000,000 lb. In addition, the report further notes that the greatest percentage gain in these convenience heat-and-eats was chalked up by bakery goods.

AMA Schedules Summer Management Conference

Basic problems of personnel and industrial relations will be covered in four seminars at a summer conference, scheduled by the American Management Assn. at Colgate U., Hamilton, N. Y., July 8-12.

Speakers will tackle personnel development programs, employee interviewing, collective bargaining, and wage administration.

Key-Opened Cans for Candy

A Continental Can Co. market survey is reported to indicate the advantages of key-opened metal cans as a package for family-size packs of candy bars.

Cans are made in several diameters and heights to hold between 12 and 16 bars, the usual number in a multiple pack. The cans offer reduced spoilage, attractive and neat display features.

Announces Award Contest

Competition is now open for an achievement award in meat processing, announces Dodge & Olcott, Inc., New York City.

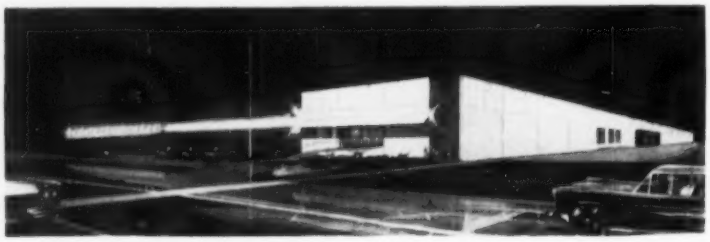
The annual prize, established in 1954, consists of $1,000 and a gold medal, and is presented to the individual who has contributed the most to development of the meat field during the current year.

Announces Lab Sponsorship

Gift of $200,000 from the Anheuser-Busch Charitable Trust for the construction of a new laboratory to be devoted to research in cellular and molecular biology has been announced by the recipient, Washington U., St. Louis.

Completion of the structure—to be named the Adolph Busch Biology Laboratory—will be made possible by an additional grant of $150,000 from the National Institute of Health.

The facility will probe cellular processes in higher animals, plants, and microorganisms.

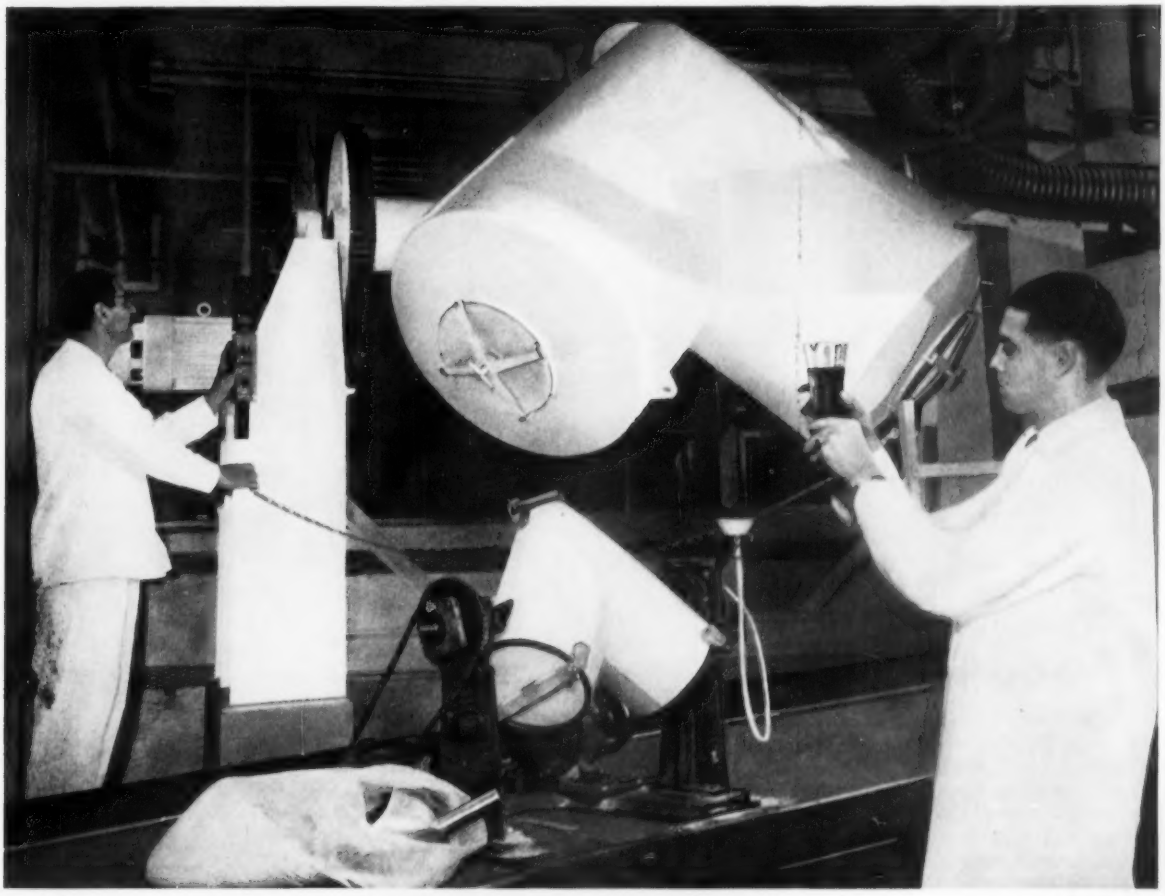


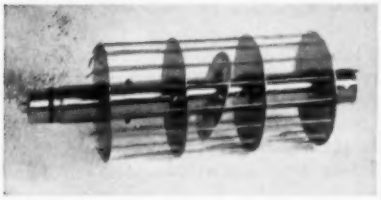
Streamlined Coffee Plant Under Way

Striking modern design features the new J. A. Folger & Co. plant now under construction at Compton, Calif. The $800,000 building, containing 135,000 sq. ft. of floor space, will be devoted to processing and packaging coffee. An 80-ft. illuminated sign on the 250-ft. facade of the structure forms an integral part of the architectural plans. Designer: Quinton Eng., Ltd., Los Angeles. Builder: Haad-Haynie-Frandsen, Inc., Beverly Hills.

Now! For the first time

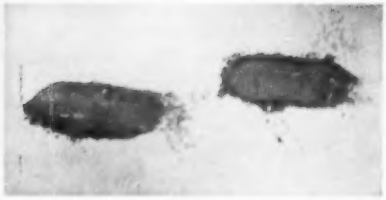
intimately blend any liquid, regardless of viscosity, into dry solids–in one fast step–even up to 40% liquid volume by weight





VERSATILE. This wire cage assembly gives you three blenders in one. With it you can blend liquids into solids, or obtain dry intensive mixing action. Remove it and get gentle blending.

TYPICAL EXAMPLE. Bar breaks down agglomerates in material at left and prevents new agglomeration as liquid is added. Note uniform consistency in finished blend at right.



ABSOLUTE UNIFORMITY. Laboratory smear test reveals streaks where standard blending methods are used (left). With P-K's exclusive design, complete blending is assured (right).

These results can be proved in your own lab with a P-K Laboratory Model Liquid-Solids* Blender. 8 or 16 qt. capacity available from stock for instant delivery.

Scale-ups from lab tests are equalled or bettered in P-K production models with capacities from 1 to 50 cubic feet. This is a completely new concept in liquid-solids blending —exclusive with P-K.

Write now for Bulletins 15A on lab units, 7-15-A on production units of P-K liquid-solids blenders. The Patterson-Kelley Co., Inc., 146 Hanson Street, East Stroudsburg, Pa.

Patterson Kelley

Chemical and Process Division

P-K Twin Shell Blenders* • Heat Exchangers

Packaged Pilot Plants • P-K Lever-Lock Doors*

*Patents pending

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2 NEW

POWDER FILLERS

for

LOW and MEDIUM SPEEDS

VACUFLOW JR.

Single head semi-automatic machine for filling wide range of free flowing and non-free flowing materials. Its low initial cost and dependable, versatile operation makes it a "natural" for the producer of "low volume" items.

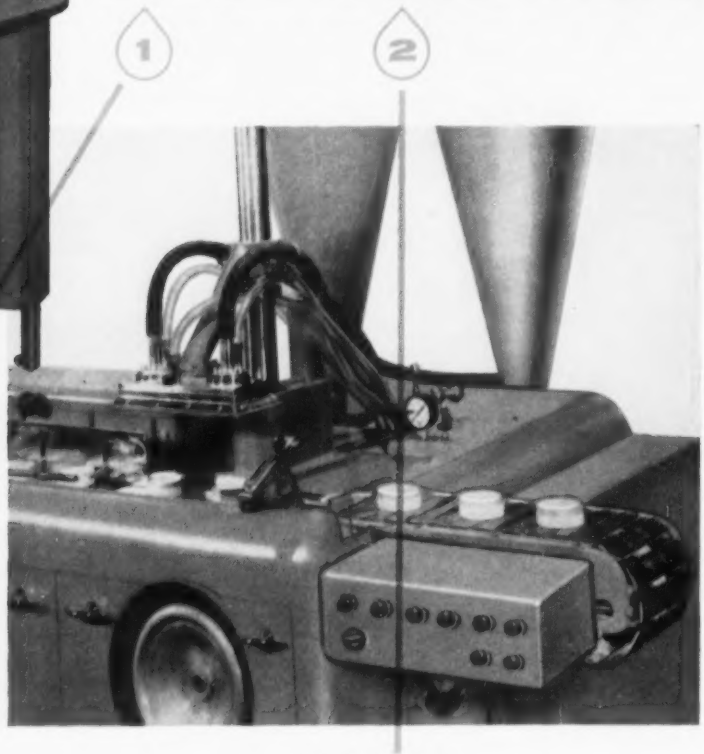
Electric timing devices and solenoid valves permit excellent control of speed and density of pack. Filling cycle can be changed when required from alternating vacuum pulses to non-alternating system. Once set the cycle is completely automatic and constant, repeating exactly as attendant steps on pedal.

Rigid and non-rigid containers may be handled on Vacuflow Jr. including bottles, jars, metal end canisters, powder boxes and conventional "squeeze" bottles.

Standard model takes sizes up to 6" high.

Full changeover, including replacement of filling head and shroud, may be done in less than 10 minutes. Unit comes fully equipped with vacuum power plant and filter system.

WRITE FOR COMPLETE INFORMATION



DUO-VAC

Fully automatic powder filler for both rigid and non-rigid containers with variable speed control to permit range of 15 to 40 containers per minute.

Incoming containers are spaced and moved through machine by means of a rotating dial and synchronized transport mechanism. Containers remain on conveyor level as filling heads automatically lower to seal and fill by standard Vacuflow system — the method which alternates pressure several times during cycle so as to pack the powder as desired and, at the same time, keep screen sections clean for proper operation.

Unit handles containers ranging from 1½" to 6" in diameter and from ¾" to 8" in height. When no shrouding is involved, much taller containers may be run.

PNEUMATIC SCALE CORP., LTD., 91 Newport Ave., Quincy 71, Mass. *Also: New York; Chicago; Dallas; San Francisco; Los Angeles; Seattle; Leeds, England. Canadian Division: Delamere & Williams Company, Ltd., Toronto.*

★PNEUMATIC ***Packaging and Bottling Equipment***

Announces New Tea-Maker

Public apathy to drinking tea in restaurants, industrial plants, and other institutions is now under attack with a new automatic brewer devised by Food Machinery & Chemical Corp., Tea Council of the U. S. A., Inc., and the National Restaurant Assn. With this device, operator places a pre-measured amount of tea (4 or 8 oz.) in an infuser. A hand timer (30 sec. or 1 min.) controls flow of hot water (200F.) that sprays on leaves and produces a concentrate. To serve, buttons are pushed that dispense concentrate and either hot or cold water for iced or regular drinks.

Invents Sweetpotato Treats

Brand new party snacks—devised from chipped, diced, Julienne stripped, and French fried sweetpotatoes—have been dreamed up by USDA's Eastern development lab.

Acclaiming these latest sweet treats as delicious, Department of Agriculture scientists are hoping for quick commercialization of the deep fried products to stem the decline of sweet potato consumption, which has plummeted from 19.4 lb. per capita in 1939 to 8.2 lb. in '53.

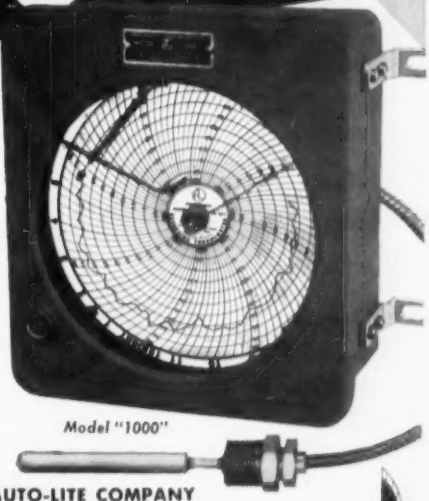
". . . And just aim it at your vineyard—and you got raisins!"

AUTO-LITE

TEMPERATURE RECORDING . . .

Newly designed, Model "1000" Auto-Lite Recorder gives permanent proof of temperature behavior. • 6" clear reading chart; various standard ranges from minus 40°F. to plus 550°F. • 3 standard types; choice of 24-hr. or 7-day cycle. • Electric or mechanical chart drive. • With capillary tubing for remote reading. Priced from $49.50.

Send for new catalog describing many styles of Auto-Lite temperature Recorders and Indicators.

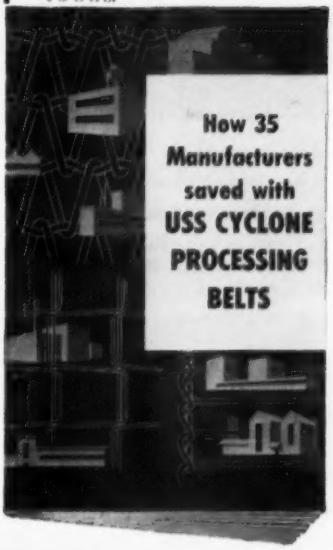


Model "1000"

THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO

TEMPERATURE RECORDERS

Learn how CYCLONE conveyor belts improve production pictures



Now you can learn how 35 manufacturers have profitably put USS Cyclone Processing Belts to work on their production lines. Taken right from our sales files, these capsule case histories are examples of manufacturers improving quality, reducing breakage, speeding up production, and cutting costs . . . all with the help of Cyclone Belts. Send us the attached coupon and we'll send you your copy of this informative booklet, free.

Cyclone Processing Belts *are engineered for each specific situation.* Available in stainless or carbon steel, Cyclone Belts, in various sizes, types and finishes, can be fabricated to fit your exact need. Learn about them, now.

CYCLONE FENCE DEPARTMENT
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL
WAUKEGAN, ILLINOIS

MAIL THIS COUPON TODAY

Cyclone Fence, Dept. H-67
Waukegan, Illinois

Name .....
Company .....
Address .....
City ..... State .....

UNITED STATES STEEL

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LOW-COST PRODUCT PROTECTION

For over forty-five years **NULOMOLINE**®—the *pioneer* invert sugar—has been used as a "BALANCING" ingredient by Bakers, Candymakers, Syrup Processors, Fruit Preservers . . . in frozen foods, desserts, icings, toppings, spreads, and other food preparations.

NULOMOLINE is hygroscopic . . . attracts, retains, and equalizes distribution of moisture . . . retards crystallization . . . increases osmotic pressure . . . stabilizes density of syrup portion . . . resists fermentation . . . controls texture and consistence . . . promotes product uniformity . . . improves taste and appearance.

USE NULOMOLINE . . . THE LOW-COST HYGROSCOPIC HUMECTANT . . .

Packed in large and small containers—
in tank wagons and tank cars.

ORDER DIRECT OR THROUGH YOUR JOBBER.

Write, phone, or call and discuss your problems in confidence with **NULOMOLINE SERVICE.** Our technical and practical staffs are *at your service!*

THE NULOMOLINE DIVISION
AMERICAN MOLASSES COMPANY

Manufacturers of NULOMOLINE *(Standardized Invert Sugar) and Syrups*

120 WALL STREET, NEW YORK 5, N. Y.

330 East N. Water St., Chicago 11, Ill. 1300 West 3rd St., Los Angeles 17, Calif

NULOMOLINE, LTD.: 1461 Parthenais St., Montreal, Canada

Perfect Safety Wins Plaques For Careful Food Plants

Thirty-eight food companies have chalked up perfect safety records in a total of one-hundred plants during 1956—and will soon receive first place plaques from the National Safety Council.

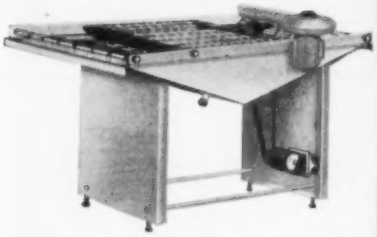
Classified in eight divisions according to the products they handle, the concerns compete in classes on the basis of their working man-hours during the Jan. to Apr. period, which ranged from 24,000 to 500,000 hr.

Winners are: General Mills Inc. (10 plants), General Foods Corp. (3 plants), Ralston Purina Co. (18), Pillsbury Mills, Inc. (3), International Milling Co. (5), Spencer Kellogg & Son (2), Carnation Co. (4), Nestle Co., Inc., Best Foods, Inc., Glidden Co., Quaker Oats Co., Peter Paul Co., Krafts Co. (8), Southern Dairies, Inc. (4), Crosse & Blackwell Co., National Sea Products Co., Anderson Clayton & Co., Libby, McNeill & Libby (3), Larsen Co., H. J. Heinz Co., C. H. Musselman Co., California Packing Corp., Morton Salt Co., W. N. Clark Co., Pabst Brewing Co., Carling Brewing Co., National Biscuit Co. (7), Log Cabin Bread Co., Weber Baking Co. (2), Conlon Baking Co., Pepperidge Farms, Amalgamated Sugar Co., Detroit Creamery Co. (3), Central Dairy Products, Sealtest-Sheffield Farms (4), Hygeia Milk Prods., Sunrise Dairies, Inc., and Beatrice Foods Co.

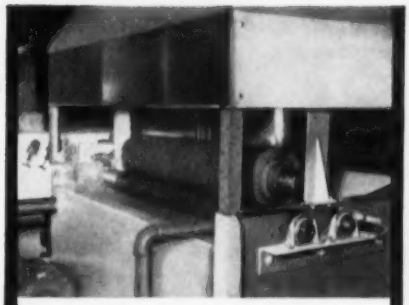
Compact Radiation Source

Simplicity of the latest radiation installations is exemplified by this cobalt-60 source, recently set up at Dewey & Almy Co., Cambridge, Mass. Samples are inserted into hollow cobalt tube with a manually operated arm. Extra plug in rack (right) seals unit during sample changes. Cobalt is surrounded by a 2-ton lead sheath.

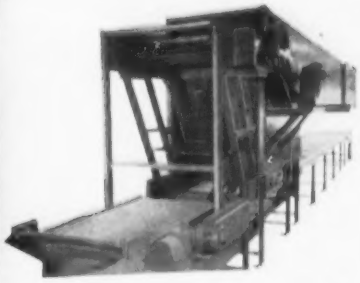
← For more data, circle this page number on card at back



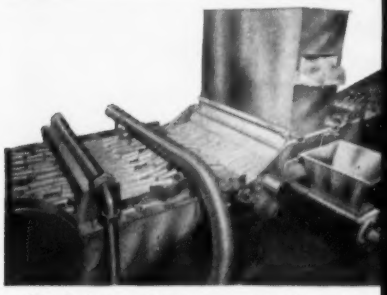
Meat Tenderizing Dip Tank. Continuous sanitary means of tenderizing strip steak and beef cuts.



The Continuous Paper Filter. Adaptable to food cooking processes for product improvement and oil savings.



The Multi-Tier Cooler. Features controlled cooling and gentle handling with savings of costly floor area.

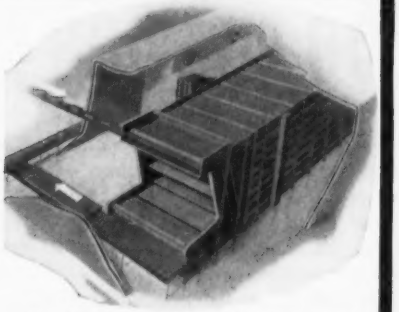


The Batterer and Breader. Flexible, sanitary for meat, fish, shrimp and other seafood products.

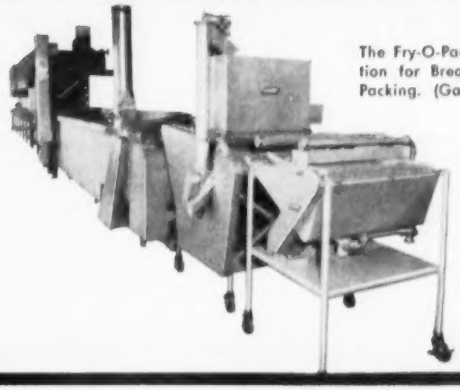
PROCESS WITH PROFITS

Let Greer engineering experience and equipment help you to realize

- Better Production
- Increased Flexibility
- Space Savings
- Improved Products
- Reduced Labor Costs

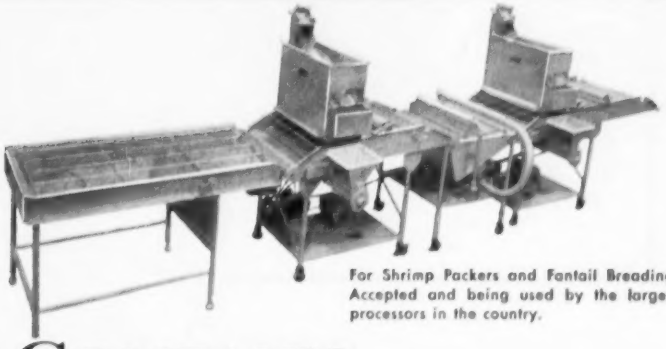


The Automatic Multi-Tier Freezer. Proven and accepted for multiple advantages.



The Fry-O-Pac Line with continuous operation for Breading, Cooking, Cooling and Packing. (Gas or Electric Cookers)

A GROWING INDUSTRY
DEMANDS EQUIPMENT DESIGNED
TO DO THE JOB BETTER.
WRITE FOR BULLETINS
AND DETAILED INFORMATION.



For Shrimp Packers and Fantail Breading. Accepted and being used by the largest processors in the country.

Call or write

J. W. GREER COMPANY

WILMINGTON, MASSACHUSETTS

Sales Engineering Offices: Chicago, Ill., San Francisco, Calif.

GREER

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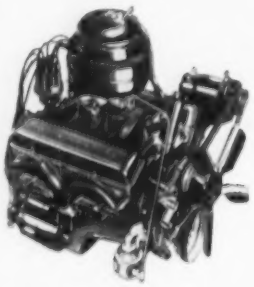
POWERFUL REASONS WHY A CHEVROLET STAYS ON THE JOB...SAVES ON THE JOB!

COMPACT CHEVY V8

(weighs up to 150 lbs. less than others)

- Shortest stroke of any truck V8
- Short, durable connecting rods
- Vertically compact cylinder block
- Rugged yet light crankshaft
- Efficient hydraulic valve lifters
- Long-wearing Moraine bearings



Chevrolet trucks are powered by V8's that make every ounce count. Because of their trimmed-down design, they use less power to haul their own weight and put more power into hustling your cargoes. Like all Chevrolet truck components, these engines are efficient performers—and that means top economy and dependability!

Chevy's the dollar saver *de luxe* of the American road, and many of the reasons why can be found beneath the Chevrolet truck hood. That's where you'll often find a great V8 that's at the head of its class for compact, *efficient* short-stroke design. You won't find features to equal all those listed here (at left) in any other truck V8's today. Or, if you prefer a 6, Chevy's got the most popular 6-cylinder powerplants in the history of hauling. They're honest-to-goodness *truck* engines, specially built to *stay* and *save* on rough, tough hauling jobs.

You'll find that a Chevrolet truck gives you *so much* to save with! Your Chevrolet dealer is waiting to fill you in on all the facts. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Biggest sellers . . . because they're biggest savers! CHEVROLET

CHEVROLET TASK·FORCE 57 TRUCKS

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Dairy Saves With Bag, Carton

Bag-in-carton shippers are piling up big packaging and handling savings for Rochester Dairy Cooperative, Rochester, Minn. The unusual containers (FE April '56, p. 62) have clipped 0.6c. per gallon from the cost of producing liquid ice cream mix—mainly by reducing shipping weight of the packages, cutting truck loading time by 57%, and eliminating the necessity of washing out metal cans. Cartons are by Hoerner Boxes of Minneapolis, Inc.; polyethylene bags from Winzen Research, Inc., Minneapolis.

Congressmen Eat Rayed Food

Fresh foods—preserved for a period of two months by atomic radiations—were sampled recently by Congressmen and reporters at a demonstration luncheon sponsored by the Army in Washington, D. C.

Purpose of the gathering was to inform the Solons and public on the progress being made in A-ray preservation, and to dramatize the need for the greatly expanded research facility now under construction at Lathrop, Calif.

Most Dairy Goods Show Gain In '56 Consumption Figures

Total consumption of fluid milk and cream, butter, cheese, ice creams, and dry whole milk rose in 1956, while evaporated and condensed milks dropped, declares the National Dairy Council.

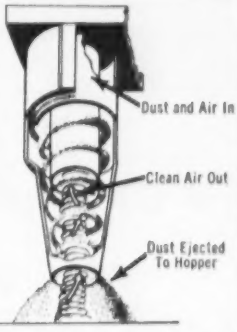
Actual output figures are: Fluid milk and cream, 64,937,000,000 lb. (63,504,000,000 lb. in '55); butter, 31,482,000,000 lb. (30,837,000,000 lb.); cheese, 13,648,000,000 lb. (13,-

If you use a Spray Drying Process ...here's NEWS from DUSTEX !

Dustex can show you how to recover more product from your spray drying operation...how to cut maintenance costs and time with the addition of a Dustex M-40-A Microclone dust collector.

The M-40-A Microclone brings you all the advantages of high efficiency, dry, mechanical collection, plus the additional advantage of easy accessibility for sanitizing and cleaning. This combination of efficiency and accessibility has proven an investment in profit for many manufacturers and processors of powdered milk, coffee, feed, sugar and flour.

A Dustex representative can give you a factual demonstration, under actual operating conditions, on the performance, amount of recovery and ease of maintenance—write for literature.

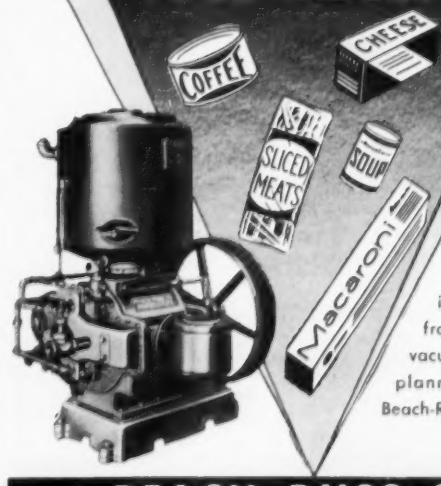


● This cutaway model of a single Microclone tube shows the operating principle of the miniature cyclone.

Dustex CORP.

P. O. BOX 2520 • BUFFALO 25, N. Y.

VACUUM Specialists FOR THE FOOD INDUSTRY



To the consumer "VACUUM PACKED" implies freshness and dependability — vital selling points for all food products — from "soup to nuts." Beach-Russ is a pioneer in aiding food processors and food equipment manufacturers in devising new methods of processing and packaging — of guaranteeing product quality — through the use of vacuum. Beach-Russ Vacuum Pumps are available in types and sizes to meet all needs from 1 to 1800 c.f.m., at high or low vacua. If you need technical advice in planning a new installation, contact Beach-Russ. *Write for Bulletin 89.*

BEACH-RUSS COMPANY

50 CHURCH STREET • NEW YORK 7, N. Y.

Address Department 57

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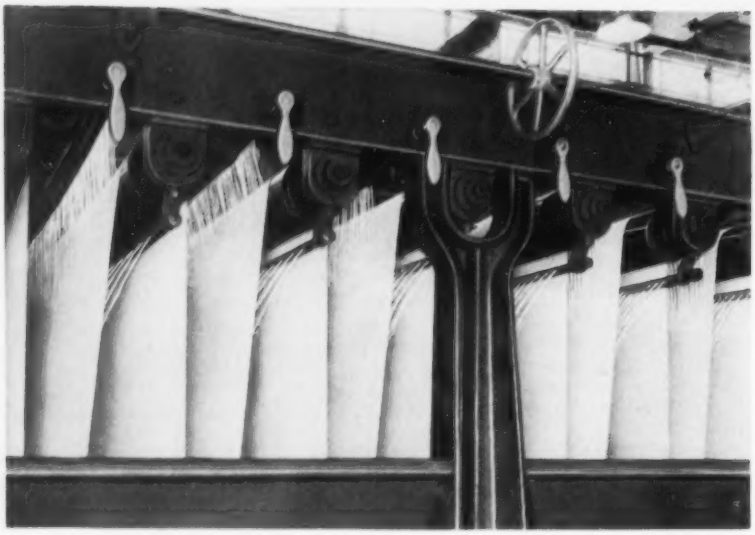


For PURITY we wash Patapar®

In the manufacture of high wet-strength, grease-resisting Patapar Vegetable Parchment, washing is a routine procedure. The washing is done with continuous sprays of sparkling, freshly filtered water to assure the cleanest sheet scientifically possible.

Made from 100% pure cellulose, Patapar is completely NON-TOXIC, odorless and tasteless.

Many different types to fill special needs

Produced in more than a hundred different types, Patapar offers qualities that meet an amazing range of specifications and needs.

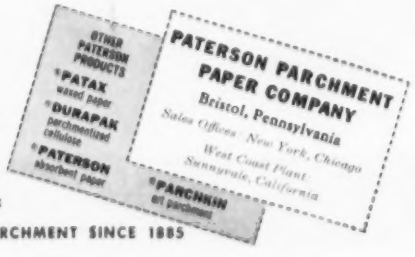
Example: *In food fields*, colorfully printed Patapar is outstanding as an eye compelling packaging material. Butter, cheese, sausage, ham, bacon, lard, poultry, margarine are a few of the products that entrust flavor and quality to its protecting folds.

Furnished plain or colorfully printed

Patapar comes to you plain or beautifully printed by letterpress or lithography. We will reproduce your present wrapper design or create a colorful new one for you.

For detailed information and samples write us on your company letterhead, telling your requirements.

Patapar®
Vegetable Parchment
HI-WET-STRENGTH • GREASE-RESISTING



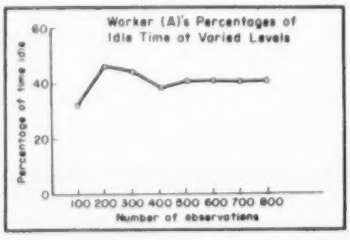
HEADQUARTERS FOR VEGETABLE PARCHMENT SINCE 1885

518,000,000); ice creams, 8,450,000,000 lb. (8,160,000,000); evaporated milk, 5,453,000,000 lb. (5,490,000,000); condensed milk, 804,000,000 lb. (807,000,000); and dry whole milk, 924,000,000 lb. (812,000,000).

On the per capita consumption side, fluid milk gained 2 qt. per person to hit 144 qt. for the year, fluid cream maintained its 47 lb. rate, cheese gained 0.3 lb. for a 12.5-lb. consumption, ice cream rose 0.3 qt. to hit 15.6, butter dropped 0.1 lb. to level at 8.8 lb., evaporated and condensed milks lost 0.5 lb. for a 15.5 lb. rate, dry whole and non-fat dry milks rested at 5.26 lb., a 0.49-lb. drop.

ADMI Elects Officers

Picked to lead the American Dry Milk Institute, Inc., Chicago, for the coming year are: R. M. Hadrath, chairman; E. A. Pool, vice-chairman; and M. R. DeBaets, secretary-treasurer.



Corrected Curve

Graph above is rectified form of one incorrectly printed in article, "Fast and Simple Sampling Method for Checking Labor Performance" (FE Apr., p. 65). As correctly shown here, Worker (A)'s "scores" fluctuated during initial levels of study, then subsequently held steady at 40%.

BRIEFLY

• **PACKAGING** has received a boost through a 4-year scholarship at Michigan State University, sponsored by National Starch Products and the Packaging Institute, Inc.

• **DAIRY SCORE CARDS** have been revised by the USDA with help from the American Dairy Science Assn. Copies of the new form are available from USDA's ARS, Dairy Husbandry Research Branch, Beltsville, Md.

• **BLACK PEPPER** quality can be gaged by a new test, announces the

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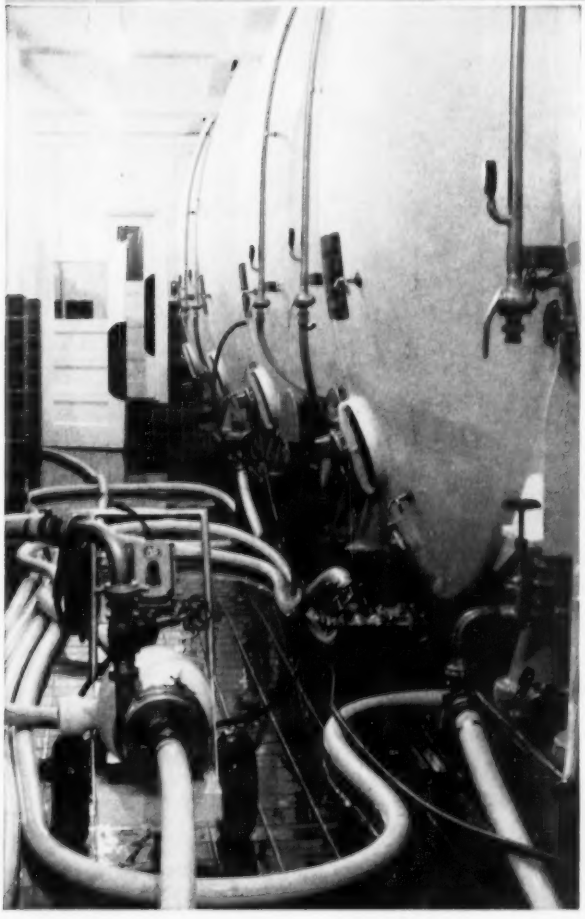
TRI-CLOVER *Centrifugal* PUMPS

meet specific beverage industry requirements



Shown directly above and in the top view is a specially-mounted portable Tri-Clover "Pump King" Unimount sanitary centrifugal transfer pump used in a large West Coast plant.

ANY PRODUCT that will flow to them can be handled efficiently and economically with Tri-Clover Division's non-agitating centrifugal pumps . . . and an increasing number of beverage plants are using these modern pumps to meet a variety of applications.

Available in stainless steel, nickel alloy, bronze and cast iron, Tri-Clover pumps are designed for efficient liquid transmission and low maintenance, offering many exclusive features, including patented screw type impellers with quick-acting impeller clips, lightweight heads with a minimum of parts, casing construction permitting fast, easy assembly or disassembly—and a wide choice of seals for various applications.

Tri-Clover's exclusive developments are the result of many years of specialized engineering experience and thorough knowledge of liquid handling. Let our engineering staff work with you in solving your pumping problems . . . *or send for the complete Tri-Clover Pump Catalog 253 today.*

P256-F

LADISH CO.
Tri-Clover Division
Kenosha Wisconsin

See your nearest TRI-CLOVER distributor

TRI-CLOVER

EXPORT DEPT.
8 So. Michigan Ave.
Chicago 3, U.S.A.

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Mikro-D

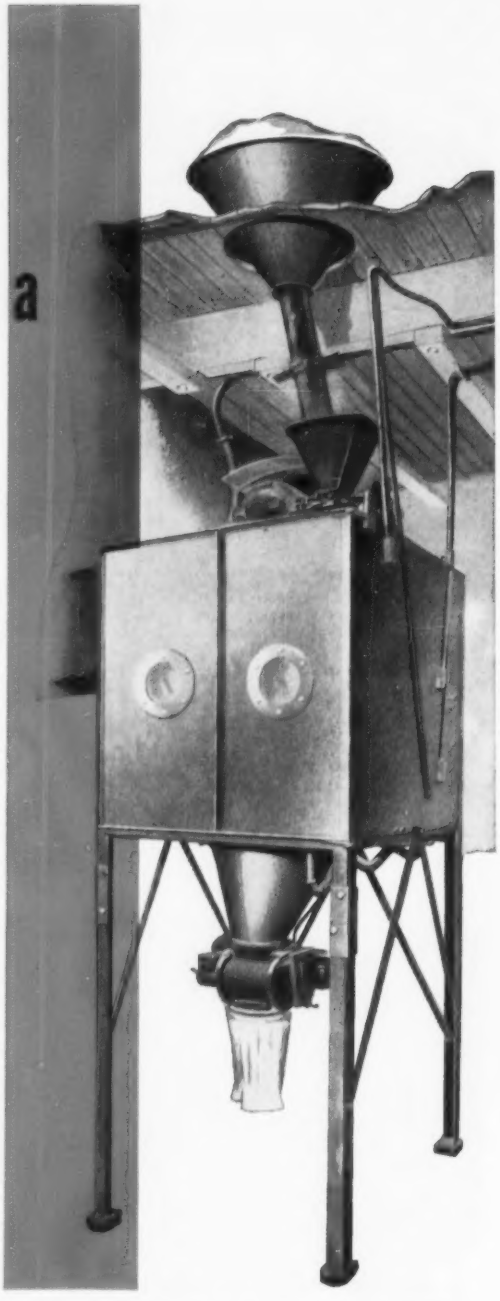
important "ingredient" in a quality chocolate product...

Mikro-D Installation at A. N. Stollwerck grinds and collects sugar in efficient, economical, straight-line operation!

Specialists in chocolate products for more than 80 years, A. N. Stollwerck, Inc. serves leading candy makers, ice cream companies, and bakeries across the country. Quality is important to Stollwerck, and economy as well . . . two factors that led to selection of MIKRO-D equipment for their sugar grinding process.

While the arrangement of the units shown here offers a fine example of the flexibility of MIKRO-D equipment, production figures tell an even more pertinent story—utilizing only a 15 h.p. motor, the MIKRO-D installation continuously produces 2000 lbs. of freshly-ground sugar per hour, with a fineness of 90-95% through 200 mesh!

MIKRO-D equipment—individually engineered to do a specific job—can put similar efficiency and economy into your pulverizing and collecting operation. Arrange to send us a sample of the unground product. We'll be glad to make test runs to your specifications . . . and submit laboratory findings and recommendations, entirely without obligation.



MIKRO-D units at Camden, N. J. plant of A. N. Stollwerck, Inc., consist of a #2 MIKRO-Pulverizer mounted directly on top of a 24-1-36 MIKRO-COLLECTOR, with 8" MIKRO AIRLOCK. Unground sugar is easily poured into a hopper from floor above, to be carried through the pulverizing and collecting process.

Mikro-D

PULVERIZING MACHINERY DIVISION

METALS DISINTEGRATING COMPANY INC.

97 Chatham Road Summit, New Jersey

Genuine Mikro-D Replacement Parts available from large stock within 48 hours.

MANUFACTURERS OF PULVERIZING, AIR CONVEYING AND DUST COLLECTION EQUIPMENT

American Spice Trade Assn. The method, termed a colorimetric acid analysis, was developed with the help of USDA.

• **CANDY SHELF-LIFE** can be protected by antioxidants—but these should be selected with an eye to the fat used in the product, declares USDA's Southern lab. Findings are detailed in a new booklet, obtainable from the New Orleans facility.

• **GAS FUMES** from a commercial solvent used to extract caffein from coffee recently felled many workers at a General Foods Corp. plant in Hoboken, N. J. The fumes, escaping from a leak in a pressurized supply tank, acted as an anesthetic and toppled employees before they had a chance to escape.

Schedule of Events

June

16-29—Material Handling Training Conference; Industrial Management Center, Lake Placid, N. Y.

20—Arwell Sanitation Seminar; Hardware Mutuals Auditorium, Stevens Point, Wis.

26-29—Processed Apples Institute, annual meeting; Greenbrier Hotel, White Sulpher Springs, W. Va.

26-29—American Dairy Science Assn., annual meeting; Oklahoma A & M College, Stillwater.

27-J2—Bakery Equipment Mfrs. Assn., annual meeting; Manior Richelieu, Murray Bay, P. Q. Canada.

July

1- 3—National Dairy Council, annual meeting; Edgewater Beach Hotel, Chicago.

18-19—National Kraut Packers Assn., annual convention; Catawba Cliffs Beach Club, Port Clinton, Ohio.

22-24—National Macaroni Mfrs. Assn., annual meeting; Grand Hotel, Mackinac Island, Mich.

Action on Standards

Following actions have been taken by the Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U. S. Standards and allowable tolerances of various pesticides on raw agricultural commodities. References are to the *Federal Register*.

Canned squash (summer type), AMS notice of proposed U. S. Standards, *F. R.*, Apr. 16, p. 2615.

Apricots, canned, AMS notice of U. S. Standards, *F. R.*, Apr. 16, p. 2569.

Celery, AMS proposed revision of U. S. Standards, *F. R.*, Apr. 25, p. 2912.

Tuna fish, canned, FDA Standards of Identity, *F. R.*, May 2, p. 3106.

On fat of meat from beef cattle, hogs, sheep and poultry, eggs of

World's Largest Quick-Freezing Plant Finds

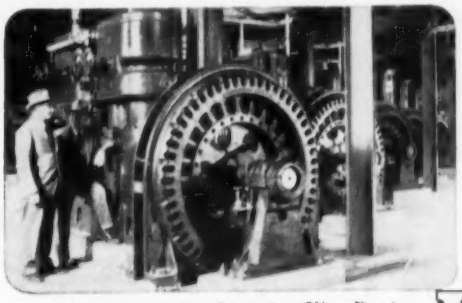
FRICK

Refrigeration Highly Dependable

Seabrook Farms, near Bridgeton, N. J., have been using Frick refrigerating equipment exclusively since 1929. Today, Seabrook operates 22 Frick compressors. Of these, 12 are heavy-duty 4-cyl. machines, with 12-in. stroke. Total refrigeration horsepower is over 5000. Belford Seabrook, vice president in charge of engineering, writes about the excellent service record made by these big machines, several of which are in continuous operation, day and night, most of the year:

"Figured on the original investment in these compressors, the annual cost of repair parts, including their installation, is averaging only 1 per cent." Other users have had Frick compressors in continuous operation for four to six years without even opening the machines!

If you want the last word in reliable refrigeration, specify Frick equipment, and accept nothing less.



Belford Seabrook, Operating Vice President, checks the performance of the Frick compressors.

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA., U. S. A.

TON TEX

where sanitation is vital

food processors choose TON-TEX conveyor belting

PUR-O-TEX and WHITE CONVEYOR are white, non-toxic belts. Food products are conveyed on them without absorbing any taste or odor. These Ton-Tex belts are made of plies of cotton duck treated with special compounds. They withstand mild abrasion, and can be washed and kept clean. Ton-Tex belting is permanently pliable and can be vulcanized endless.

PUR-O-TEX resists water, heat, oils. It is extensively used by bakeries, food shops, restaurants, fish and meat packers, fruit and vegetable processors.

WHITE CONVEYOR handles food products that are free from oils and greases.

● *Write us if you have conveyor applications that require the utmost in sanitation.*

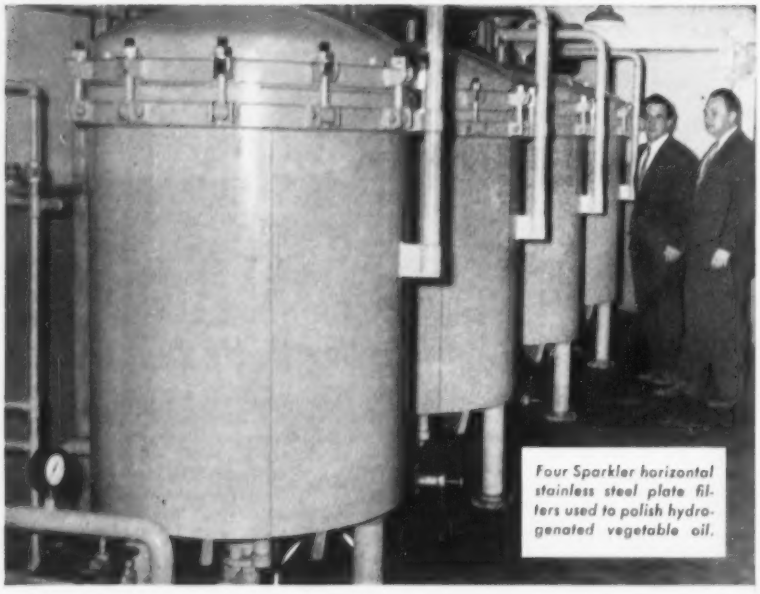
TON-TEX CORPORATION, GRAND RAPIDS 2, MICH.

31 COLUMBUS AVENUE
ENGLEWOOD, NEW JERSEY

759 W. SAN CARLOS STREET
SAN JOSE 26, CALIFORNIA

TON-TEX CONVEYOR AND TRANSMISSION BELTING

TON TEX



Four Sparkler horizontal stainless steel plate filters used to polish hydrogenated vegetable oil.

Clearer, purer hydrogenated vegetable oil obtained with

Sparkler Filters

SPARKLER horizontal plate FILTERS

At Anderson, Clayton & Co., Foods Division in Sherman, Texas, four Sparkler 33" diameter horizontal stainless steel plate filters are used to polish hydrogenated vegetable oil after it has been deodorized. Several batches of oil are filtered before a change of filter media is needed.

But when changes are required, clean plates are installed quickly in a most resourceful manner. A hoist simply lifts the filter plate cartridge through an opening in the floor above, a clean cartridge is lowered into the filter and the filter is back in operation in a matter of minutes.

Sparkler all stainless steel filters used in experimental laboratories.

This installation also employs two Sparkler all stainless steel filters, one to remove bleaching clay and the other to remove minute nickel catalysts from experimental batches of hydrogenated oil. This difficult separation of the nickel catalyst is accomplished through the use of Filtercel aid in the Sparkler filter.

Sparkler manufactures stainless steel filters in capacities up to 10,000 gallons per hour with completely accessible, easy to clean surfaces conforming to standard sanitary requirements in the food field. Special filters are engineered for special requirements. On your next food filtration application, consult with Sparkler.

Send your requirements to Mr. Eric Anderson for personal service.

Service Representatives in principal cities

SPARKLER MANUFACTURING CO.
MUNDELEIN, ILL.

Sparkler International Ltd. with plants in Canada, Holland, Italy and Australia. Filtration engineering and manufacturing exclusively for over 30 years.

chickens, popcorn, sweet corn, milo and sorghum, and milk of cows, tolerances of Aldrin, F. R., Apr. 30, p. 3053.

On copra, tolerances of ethylene oxide, F. R., May 1, p. 3069.

On eggs of chickens, fat of meat from beef cattle, hogs, sheep and poultry, popcorn, sweet corn, milo and sorghum, and milk, tolerances of Dieldrin, F. R., May 2, p. 3125.

On melons, tolerances of sodium dimethyldithiocarbamate, F. R., May 2, p. 3106.

On apples, crabapples, pears, and quinces, tolerances of S-(p-chorophenylthio) methyl o, o-diethyl phosphorodithiote, F. R., May 4, p. 3187.

On Broccoli, brussels sprouts, cabbage, cauliflower, clover, collards, kale, mustard greens, peaches, pea vines, plums, sorghum grain, spinach, strawberries, turnip tops, apples, lettuce, pears, beans, cucumbers, onions, peas, potatoes, tomatoes, and turnips, tolerances of 1-methoxycarbonyl-1-propen-2-yl dimethylphosphate, F. R., May 4, p. 3187.

On hops, tolerances of Systox, F. R., May 9, p. 3260.

On carrots, horseradish, parsnips, radishes, and salsify root, tolerances of Aldrin, F. R., May 9, p. 3257.

SIMPLIFY

YOUR CLEANING WITH METSO

Metso basic silicate detergents take over the task easily. Cleanups are quicker and safer because Metso Detergents . . .

- **Penetrate films fast**
- **Saponify or emulsify fats, oils completely**
- **Rinse freely**
- **Prevent corrosion of sensitive metals**

MORE INFORMATION IN FREE FOLDER 36-2

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METSO GRANULAR (Hydrated Metasilicate)
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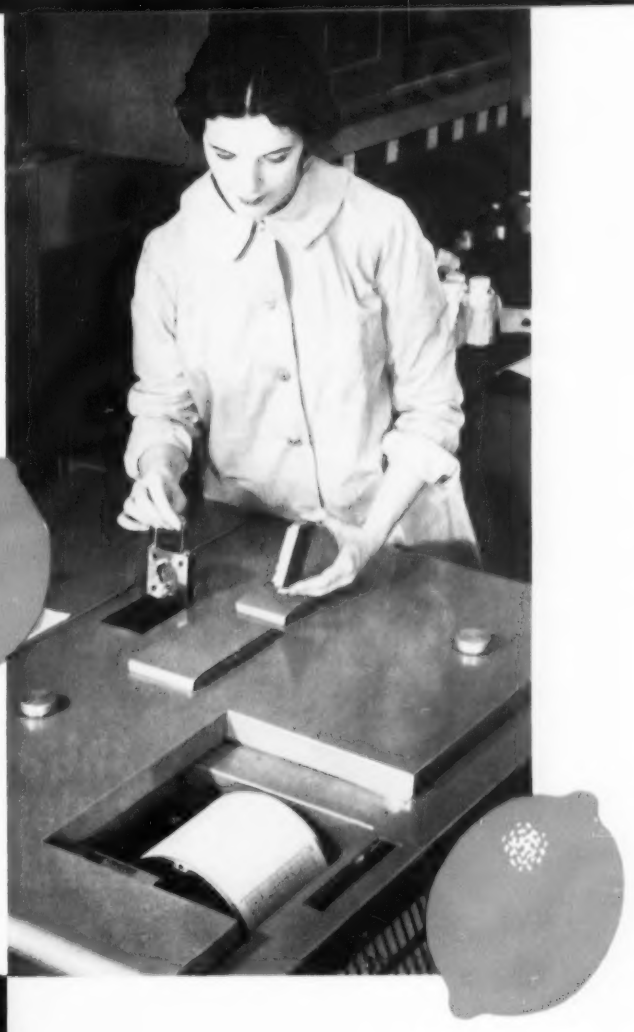
METSO DETERGENTS
FOR FOOD INDUSTRY CLEANING



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assures you of absolute
Color Standardization

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CERTIFIED
FOOD COLORS

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You are looking at a device that accurately and objectively judges colors. It unerringly establishes a set of standard color-coordinates for each color we catalog and for all special blends. Subsequent lots can then be spectrophotometrically checked against previously-set coordinates. Identical colors produce identical transmittance curves—again and again and again.

Ever alert to go beyond the minimum necessities of certification, our Food Color Laboratories have the finest possible equipment for standardizing shade, pure-dye strength and composition.

Thus, when you specify National Food Colors, you are assured of a standard of quality that our 50-year experience has shown to give most satisfactory results.

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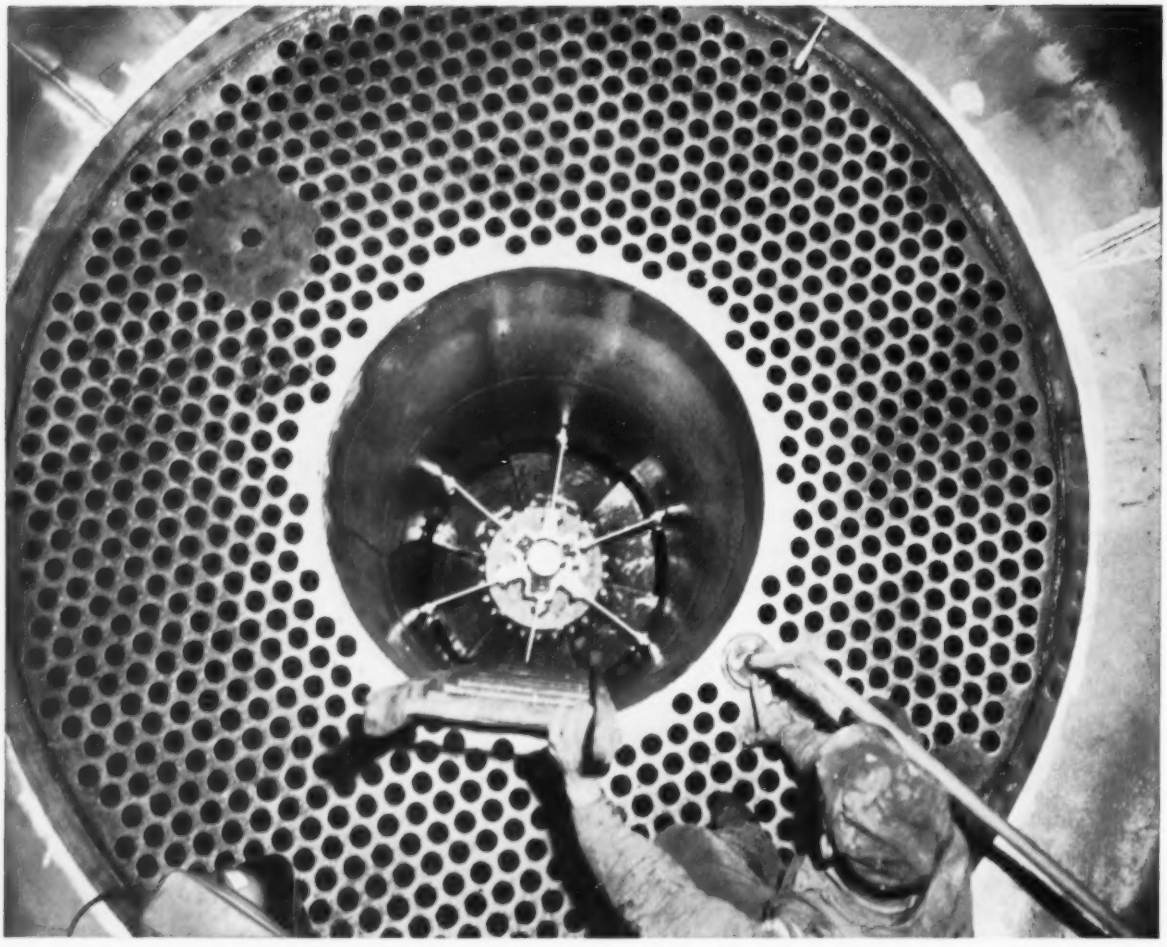

Switching to *Carpenter* Stainless Tubing pays off 5 ways!

How can *you* use the five advantages gained by a prominent distillery when it changed to Carpenter Stainless Tubing for a new stillage evaporator?

Twice the service life . . . greater operating efficiency . . . lighter weight . . . greater carrying capacity . . . and a higher cost-life ratio are the proven results obtained with more than a mile of Carpenter Stainless Tubing in this evaporator.

Additional proof of how Carpenter quality pays off on job after job is available from your Carpenter Distributor. Discover the profitable difference Carpenter can make on your own processing and transfer lines, evaporators, heat exchangers and similar applications.

Talk to your Carpenter Distributor now about cost-savings you may be able to obtain by switching to Carpenter Stainless Tubing or Pipe. Remember, you are sure of getting the highest possible degree of perfection in Carpenter tubing because it must pass the most exacting non-destructive test ever applied to stainless tubing.

MEMBER

The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"

Carpenter

more than corrosion resistance

Stainless Tubing & Pipe

MEN & COMPANIES

Personnel

William Bien has been elected v.-p. and placed in charge of all sales and advertising functions of the brewery division of Anheuser-Busch, Inc., St. Louis.

Mortimer W. Brenner has been appointed v.-p. of Schwarz Laboratories, Inc., Mount Vernon, N. Y.

Dr. Lawrence V. Burton, retired executive director of Packaging Institute, Inc., and former chief editor of "Food Industries", has been named winner of Food Technologists International Award for 1957. This honor is bestowed by the Australia Regional Sections of Institute of Food Technologists for "outstanding efforts to promote the international exchange of ideas in the field of food technology, thus contributing to international understanding".

Brown W. Cannon is newly promoted western regional v.-p. for Beatrice Foods Co., with headquarters in Denver.

John C. Coburn and **Robert S. Hall,** respectively, have been elected financial v.-p. & controller, and treasurer of Diamond Crystal Salt Co., St. Clair, Mich.

W. E. Dimmock is newly elected president of National Nu Grape Co., Atlanta. He succeeds the late W. R. Sullivan, who founded the company in 1933.

Kenneth G. Garside, v.-p. of

Dr. Elmer Martin Nelson

Babcock-Hart Award Recipient for 1957

For his "contributions to food technology, resulting in improved public health through nutrition," Dr. Elmer M. Nelson has received the Babcock-Hart Award for 1957.

This latest presentation was made at the Institute of Food Technologists meeting in May. Established in 1948 by Nutrition Foundation to honor Dr. Stephen M. Babcock for his outstanding contributions to food research, the award includes $1,000 and a plaque.

Dr. Nelson, chief, Division of Nutrition, Food and Drug Administration, has been distinguished by his work in National Research Council and American Medical Assn. His contributions have been instrumental in the standardizing of biological measures of vitamins A and D.

Born in Clark, South Dakota, Dr. Nelson attended the University of Wisconsin. There he completed his undergraduate and postgraduate work in biochemistry and nutrition, and acquired his doctorate.

His early experiments in biochemistry and nutrition revealed the relationship between vitamin D and ultraviolet light, and provided the basis for the Steenbock patent for irradiation of foods. He is also the author and co-author of more than 60 scientific publications.

DO YOUR *empty shipping* CONTAINERS STORE *as* COMPACTLY *as this?*

THE ANSWER IS NO! . . unless you're using Mid-West's NESTAWAY SYSTEM!

Wasted space — a major problem in any bakery — is reduced to a minimum by Mid-West's Nestaway System.* Why? Because Nestaway baked goods racks can be nested and stored in out-of-the-way places. Nestaway's amazing Nesting feature makes it possible to store 56 empty racks in the same amount of space required to accommodate 12 full ones, saving up to 78% in valuable floor space. (note comparison photo)

TODAY... WRITE WIRE or CALL

Only Nestaway offers you a really complete handling system for moving bread and baked goods from the wrapper to the consumer!

MID-WEST METALLIC PRODUCTS, INC.

MATERIAL HANDLING DIVISION

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"Engineered Material Handling Systems"

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Here is a Valve
Designed Exclusively for YOU!
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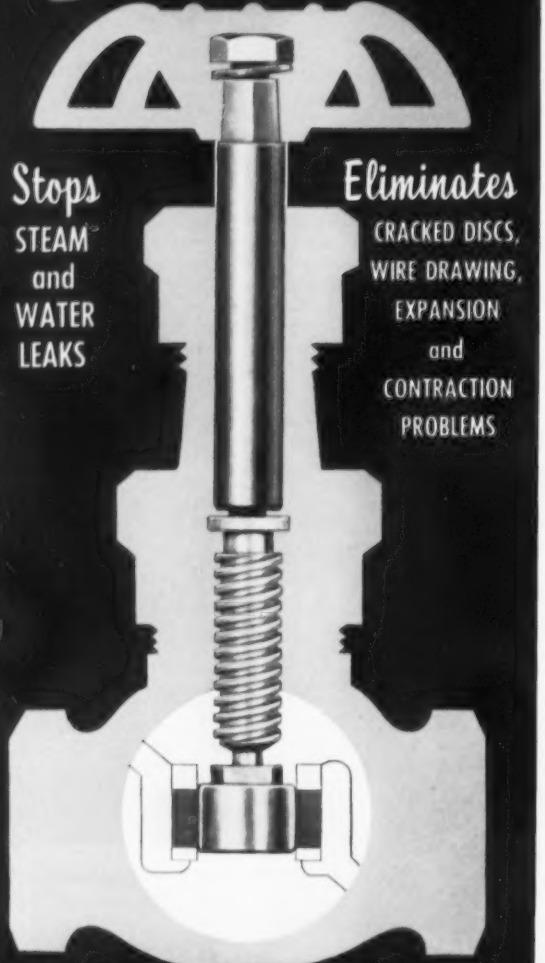


A resilient sealing ring and stainless steel piston replace the metal seat or disc found in the conventional valve, the cause of most valve troubles. The Strahman Valve seals itself as a cork seals a bottle. In throttling, the erosive action of the elements passing through the valve cannot have any effect on the sealing surfaces.

Strahman Steam and Water Valves are made of Bronze construction, with Stainless Steel Stem and Piston, assuring long life.

Write direct for complete catalogue

STRAHMAN VALVES, INC.,
16 HUDSON STREET, NEW YORK 13, U.S.A.

Herbert N. Riley, (left) executive v.-p. of H. J. Heinz Co. since 1949, is retiring after 45 yrs. of continuous service with company. **Frank Armour, Jr.** (right) is the newly elected executive v.-p. of the company. He has been v.-p. of U. S. A. operations for past 3 yrs.

finance for National Cranberry Assn., has been appointed acting general manager of the executive committee by the association. He will fill the unexpired term of James E. Glover, who has resigned.

Oscar R. Hayes, H. J. Heinz Co., Tracy, Calif., is new president of Canners League of Calif.

R. M. Hadrath, E. A. Pool, M. R. DeBaets, respectively, have been elected chairman, vice-chairman, and secretary-treasurer of American Dry Milk Institute, Inc., Chicago.

R. O. Militz and **O. F. Gale** have been appointed general works manager, and Rochester plant manager, respectively, by R. T. French Co., Rochester, N. Y.

Thomas E Wilson, H. Harold Meyer, Wesley Hardenbergh, Homer R. Davison, John Krey, and **Roy Stone,** respectively, have been re-elected board chairman, board vice-chairman, president, v.-p., treasurer, and secretary & assistant treasurer of American Meat Institute Foundation. **George M. Lewis** is newly elected v.-p.

Dr. Bernard L. Oser, director of Food Research Laboratories, Inc., Long Island City, N. Y., is newly appointed scientific editor of "Food Drug Cosmetic Law Journal."

Donald D. Rietow has been elected secretary of Dole Hawaiian Pineapple Co., Ltd., Honolulu, Hawaii.

Industry

American Poultry Co. has completed a modernization program in its San Francisco processing plant.

Bisceglia Brothers Wine Co. and **Argun Wine Co.,** both of Fresno, Calif., jointly announce that they have merged.

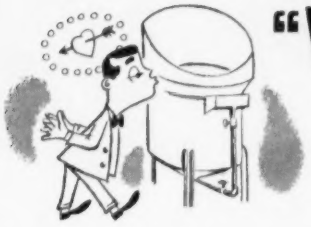
Consolidated Products Co., Danville, Ill., announces opening of a new processing plant at Galena, Ill., for production of U. S. extra grade dry sweet whey.

Campbell Soup Co. is constructing a $2 million mush-

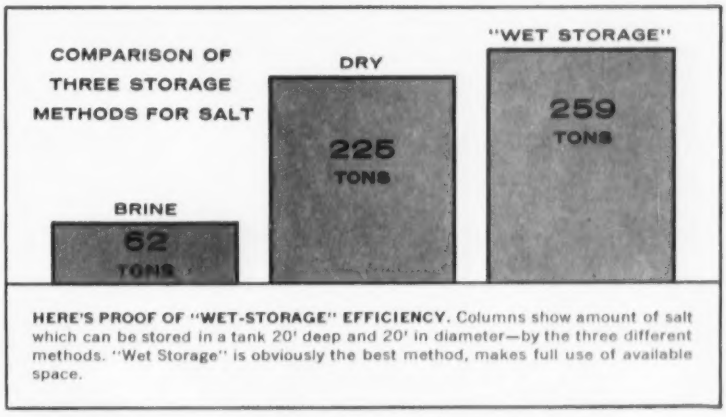
Arthur L. Reiling, Birds Eye Div., General Foods Corp., is new president of Northwest Canners & Freezers Assn. Other officers elected are H. G. Hohwiesner, first v.-p.; E. I. Pitkin, second v.-p.; C. R. Tulley, executive v.-p.; and T. B. House, asst. secretary and treasurer.

Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt



"Wet Storage"—an Economical Way to Store Rock Salt



HERE'S PROOF OF "WET-STORAGE" EFFICIENCY. Columns show amount of salt which can be stored in a tank 20' deep and 20' in diameter—by the three different methods. "Wet Storage" is obviously the best method, makes full use of available space.

A problem frequently encountered by salt-using companies is how to make the best use of available tank space for rock-salt storage. There are three basic ways to store salt in tanks: in brine form, in dry form, and in "wetted" form (dry salt stored under covering brine). Each method has certain advantages.

Salt stored in the form of fully saturated brine offers the important advantage of convenience: the brine can be pumped to points of use in the plant, eliminating salt-handling expense. However, the amount of salt which can be stored in this way is relatively small, because each cubic foot of brine contains only about 19¾ lbs. of salt in dissolved form.

Salt stored in dry form makes far better use of available tank space: each cubic foot contains an average of 72 lbs. of rock salt—about 3.6 times the amount which can be stored as brine. However, moving dry salt to points of use is time-consuming, inconvenient, and expensive. And dry-salt measurement is not as exact, or as easy, as measurement of fully saturated brine.

To get the benefits of fully saturated brine, along with the space-saving storage of dry salt, many salt-using companies are now using the tank-storage method known as "Wet Storage." This method—which actually combines features of dry storage and brine storage—offers these advantages:

1. Any given tank can store *more* salt than is possible when either dry salt or saturated brine is stored by itself.

2. There is a constantly available supply of fully saturated brine for every plant need.

3. Much less handling of rock salt is required. There are fewer salt deliveries, fewer brine-making problems.

How "Wet Storage" works. When a tank is filled with dry rock salt, almost half the storage space is actually "empty," because the salt crystals do not pack solidly together. But when the voids between the crystals are occupied by fully saturated brine, additional amounts of salt can be stored. This is because fully saturated brine itself contains 2.65 lbs. of salt per gallon. Thus, with salt stored both "wet" and in brine form in the *same* tank, maximum space is used for salt storage.

For example: in a circular tank 20 ft. in diameter, and 20 ft. in storage depth, the following amounts of salt can be stored, using the system of wet storage:

In "wetted" form the tank will hold about 231 tons of rock salt. In addition, there will be about 28 tons of salt dissolved in the covering brine. Total salt contents of the tank: 259 tons. Compare this with the other two salt-storage methods: The same tank will hold only 62 tons of salt dissolved in brine and about 225 tons in dry form.

Lixator best example of "Wet Storage" principle. Storing salt under covering brine is the basic operating principle of International's exclusive Lixate Brine-Making Process. In the Lixator, dry rock salt and fully saturated brine are combined, making fullest use of available storage space—and, at the same time, providing pure, crystal-clear brine for immediate use when and where it's needed.

In the Lixator (which is filled with rock salt), water is admitted at the top. This water dissolves some of the rock salt, to make fully saturated brine. This brine then fills the voids between the remaining salt crystals. As brine is drawn off, it is completely filtered by the salt crystals in the bottom portion of the Lixator. More rock salt is then automatically fed into the Lixator from the storage supply, and more brine is made to occupy the empty spaces.

Today, International offers many types of Lixators—all based on the principle of "Wet Storage." There are Storage Lixators, Silo Lixators, Sterling Model Lixators—in numerous designs to suit any plant layout.

TECHNICAL SERVICE WITH YOUR SALT

Through skilled and experienced "Salt Specialists," International can help you get greater efficiency and economy from the salt you use. International produces both Sterling Evaporated and Sterling Rock Salt in all types and sizes. And we also make automatic dissolvers in metal or plastic for both kinds of salt. So we can recommend the type and size of salt most perfectly suited to your needs.

If you'd like the assistance of an International "Salt Specialist" on any problem concerning salt or brine—or further information on "Wet Storage"—just contact your nearest International sales office.

International Salt Co., Scranton, Pa.

Sales Offices: Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N. J.; Buffalo, N. Y.; New York, N. Y.; Cincinnati, O.; Cleveland, O.; Philadelphia, Pa.; Pittsburgh, Pa.; and Richmond, Va.

FOR INDUSTRY, FARM, AND THE HOME—
STERLING SALT
PRODUCT OF INTERNATIONAL SALT CO., INC.

You get *prompt container delivery* from

There are seven centrally located U.S. Steel container factories across the country. Each one is completely integrated to give "next-door" service to every shipper in the area. Why not make your shipping plans around this prompt, sure U.S. Steel service.

Profit from all 5 of these U.S. Steel extras, too:

- **Best rust protection** — there's more zinc phosphate on every USS rust-inhibited container.
- **Widest container variety** — from 2½-gal. pails to 55-gal. drums, including stainless.
- **Eye-catching containers** — your containers not only ship your product, but advertise it, too — when color-decorated by U.S. Steel.
- **Job-tailored fittings** — a wide selection of fittings to choose from, others available to order.
- **Longer container life**—extra zinc phosphate gives your containers a safer, longer life.

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USS STEEL DRUMS

UNITED STATES STEEL

R. W. Moore, Sr. (right), is new board chairman and executive officer for Canada Dry Ginger Ale, Inc., New York City. **Roy Moore, Jr.** (left), son of the new chairman, has been elected president of the company.

room cultivation plant at Gazos Creek near Pescadero. Calif.

Consolidated Foods Corp., Chicago, announces that its subsidiary, Ocoma Foods Co., will discontinue activities of its egg division.

Green Giant of Canada, Ltd., Tecumseh, Ontario, announces it will launch a $1 million expansion program.

High's Dairy Products Corp., Washington, D. C., reports plans for construction of a $1 million main processing plant at Edmonston, Md.

Mt. Hood Squirt Beverage Co., Portland, Ore., announces that it has absorbed equipment and acquired personnel of Consolidated Bottling Co. in a merger.

Pepsi-Cola Co. has opened a new bottling plant at Tulsa, Okla. It has double the production capacity of the former facility. Further, **Pepsi-Cola International** announces opening of a bottling plant at Paso de los Toros, Uruguay, its second in that country.

Associated Industries

American Can Co. and **Dixie Cup Co.** jointly announce that their boards have approved a merger of the two companies. Plan calls for acquisition of all assets of Dixie Cup and its five subsidiaries by Canco.

Babcock & Wilcox Co., New York City, has elected James S. Anderson v.-p. in charge of sales of its Tubular Products Div.

Borg-Warner Corp., Chicago, announces election of Robert W. Murphy as chairman of executive committee and P. F. Smith as v.-p.

Crown Cork & Seal Co., Inc., Baltimore, Md., has elected John F. Connelly board chairman and president. Russell Gowans was elected v.-p. and also will serve as president of company's western division.

Fischer & Porter Co., Hatboro, Pa., has promoted Robert F. Lane to executive v.-p.

Pollock Paper Corp., Columbus, Ohio, has purchased manufacturing facilities of Pacific Waxed Paper Co., Seattle, and plans construction of another plant in San Jose, Calif.

Rhinelander Paper Co., Rhinelander, Wis., announces election of Willmer J. Davis as v.-p. in charge of sales.

Deaths

Mario A. Gianini, 73, Blum's Chocolates, San Francisco, candy QC expert, cited as pioneer developer of the maraschino cherry in a chocolate shell and the wafer-thin chocolate square filled with mint cream.

Harry D. Lathrop, 83, president and founder of Lathrop Paulson Co., Chicago.

Guy W. Sharpe, 71, retired v.-p. and secretary of Beech-Nut Life Savers Inc.

George G. Thompson, 75, former head of Borden Co. of Canada.

Here's

BIG-VOLUME SIFTING

with BIG SAVINGS!

RICHMOND/SPROUT-WALDRON

Gyro-Whip Sifters

Amazingly compact, yet big in output, Gyro-Whip Sifters save floor space. Simplified design reduces maintenance and cleaning time and makes possible the most rigid standards of sanitation.

The average Gyro-Whip is only 48" high, requires only 3½' x 3½' floor space, and operates on only ¾ h.p. Bolting areas range from 47.5 up to 95 sq. ft.

These Gyro-Whip Sifters are available in sizes from 3-sieve to 20-sieve mounted models. Also available are free-swinging supersifters with as many as 180 sieves. Can sift from 2 mesh up to 325 mesh. Stainless steel and wood construction. Aspirator tips to air wash graded products can be provided. Installation can be on the stream. It is a self-contained unit, ready to be bolted down and connected to existing spouting.

Write for Bulletin 135-A.

PR/SOS-P

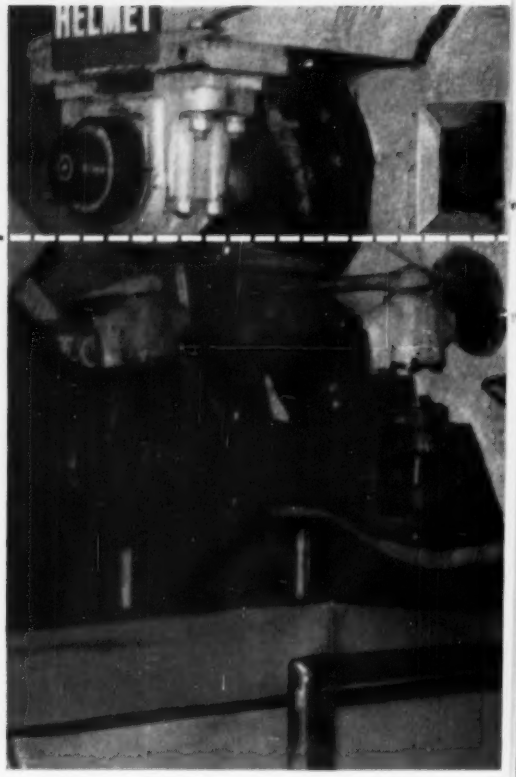
SPROUT-WALDRON

Manufacturing Engineers Since 1866

35 LOGAN STREET · MUNCY, PA.

EQUIPMENT FOR SIZE REDUCTION, MIXING & BLENDING, PELLETING & CUBING, BULK MATERIALS HANDLING, PRODUCT CLASSIFICATION.

The *ElectroniK* recorder provides a complete record of the rendering operation. Dr. L. J. Pircon, who developed the system, explains the recorder's function to an operator.



ElectroniK recorder.

. . . In Dry

use the New AMIF thermal control

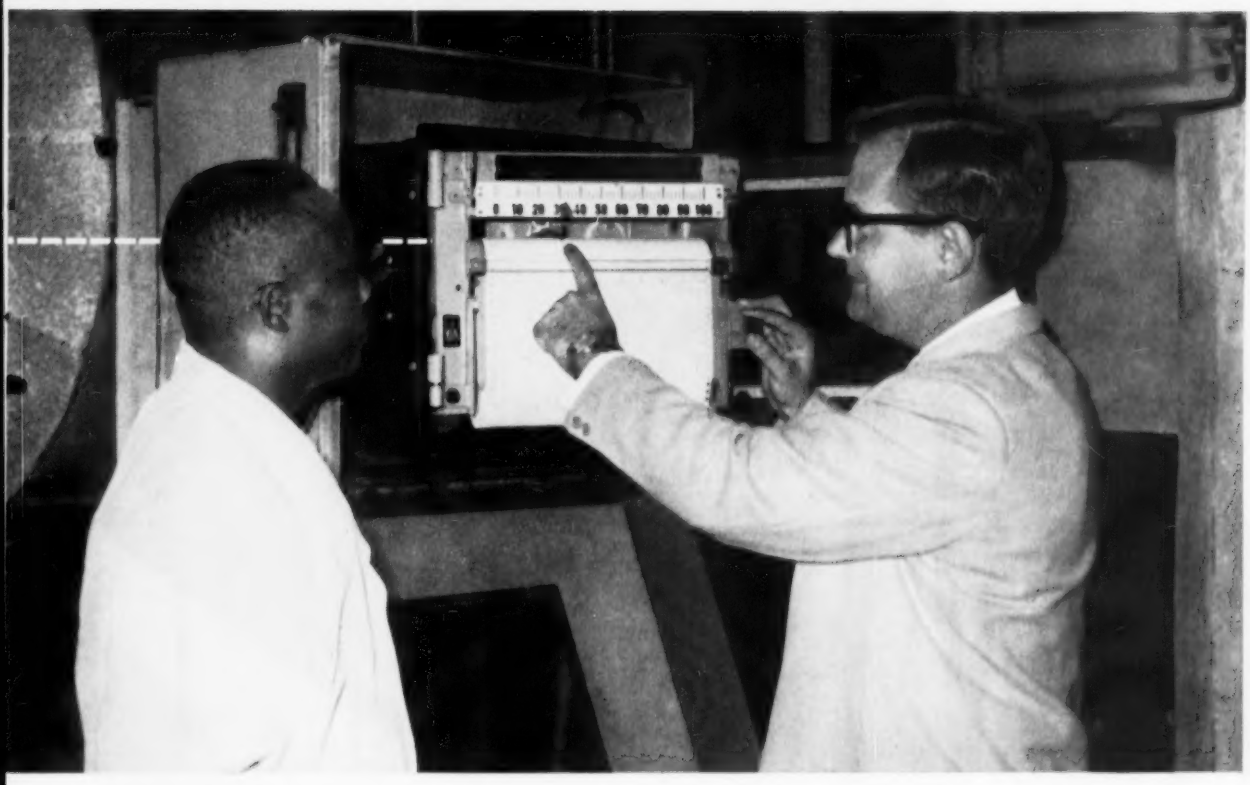
INSTALL THE AMIF THERMAL CONTROL SYSTEM IN ONE DAY

After holes are cut in renderer walls, sleeve is welded into place . . .

the sensing element is then screwed into the threaded sleeve, and . . .

leads from the sensing element are connected to the *ElectroniK* recorder.

(All photos courtesy of American Meat Institute Foundation)



Rendering

system for consistently high product quality

End-point control in dry rendering of lard and inedible fats is now a precise, foolproof operation with a new system developed by the American Meat Institute Foundation.

In providing *direct* measurement of liquid fat temperature, the AMIF Thermal Control System prevents over- and under-cooking . . . assures perfect, high-quality rendering.

The system consists of a sensing element located in the melter wall and an *ElectroniK* strip chart recorder. The rugged, easily installed sensing unit is extremely sensitive to product temperature changes. It flashes the complete rendering story to the recorder. The recorder keeps a continuous record of what goes on in the renderer . . . shows at a glance when end-point is near or has been reached. It even reveals temporary stops in melter paddles.

The system can be equipped with automatic control to sound an alarm, shut off steam and dump the cooker load at the critical temperature level.

Your nearby Honeywell sales engineer can give you complete information on the new AMIF Thermal Control System. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

Honeywell

H HONEYWELL *First in Controls*

NEW!

THE LOWEST-PRICED ORAL GRADE VITAMIN B_{12} ON THE MARKET!

...Write Today for Evaluation Sample!

Costs far *less* than today's average market prices for Vitamin B_{12}!

VITABUSCH 12 is a dried, non-viable primary fermentation product in powdered form—containing 200 micrograms of B_{12} activity per gram.

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*vita*Busch 12

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ADVANCES IN TECHNOLOGY

Radioactive Tracer Used In Dough Mixing Studies

Isotope dilution techniques have been applied to the study of bread dough mixing by labeling the fat used with I-131 dissolved in it.

Appropriate precautions were taken in disposing of the solid samples obtained during the experiments and it was found that the mixer could be easily decontaminated by conventional washing techniques.

Samples were taken according to a spatial plan so that a representative composite was obtained. For counting with a Geiger-Muller liquid sample tube, 100 mg. samples of dough were dispersed with lithium hydroxide (10% in 20% methanol). Solid samples of 40 mg. were spread as thinly as possible on circular planchettes for counting.

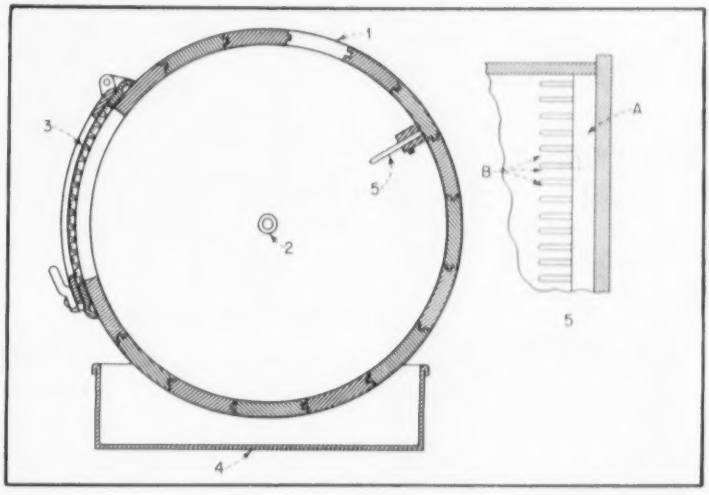
Preliminary experiments showed that for doughs of 2000 g. in a slow speed (126 rpm.) 5-qt. planetary Peerless mixer, the fat was uniformly dispersed after 2 min., and that the mixer was most efficient when fully loaded.—*J. of Science of Food & Agr.*, 234-38, April 1957.

Angel Food Cakes Made Continuously

Production of angel food cake on a continuous basis is the object of a recently patented process.

It comprises pre-mixing all ingredients, reducing pH of the mix and exposing it to intense agitation under high pressure and at a temperature under 50F.

Beaten mix is gradually fed from mixer to an oven where it is baked at a temperature exceeding 350F.—U. S. Patent 2,781,268, Feb. 12, 1957.



Improved Cheese Cheddaring Process Cuts Fat and Mineral Losses in Whey

Departing radically from accepted practice in separating whey from curd in cheese manufacture, the inventors of a newly patented process pump the mixture from the cheese vat to a special draining vessel where the separation is performed.

The inventors have discovered that such pumping causes just enough agitation to distribute curd particles uniformly through the whey and protects them from disintegration and consequent loss of fat and mineral contents.

Curd Set in Usual Way

Apparatus comprises a standard cheese vat in which the curd is formed in the usual manner, a pump, and a rotatable cylindrical vessel (1 in drawing above) which receives mixture of curds and whey through hollow trunnion (2).

The cylinder has a screened door (3) through which whey drains into trough (4) when cylinder is rotated at 6-14 revolutions per hr. Fastened to inside wall of cylinder is a breaker device (5) which keeps the curd in relatively small pieces. Its construction is detailed in drawing at right. Here, (A) is a beam that is secured to the cylinder wall, and (B) are rods embedded in it which break up the large balls of curd.

The inventors claim that cheese body is developed in from ¼ to ⅓ the time normally required, and that fat and mineral losses in the whey are practically eliminated.—US Patent 2, 782,122, Feb. 19, 1957.

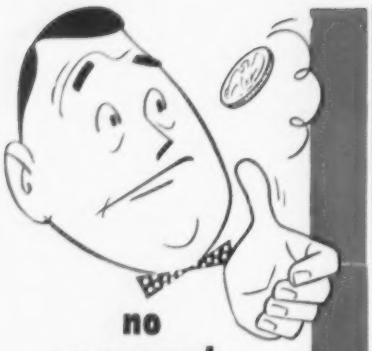
Role of Flour Lipids in Baking

Baking characteristics of flour in Great Britain have changed in recent years with reduction in extraction from 80%, and quality and age of wheats constituting the grists.

Flour lipids have changed as well, and some of the effects observed earlier no longer hold.

The lipid content as well as their composition differs from one milling product to another. Thus, the endosperm has about 0.52% extractable lipid of iodine value 105.2 and nitrogen to phosphorus ratio of 5.8. Bran, on the other hand, has 3.90% lipids of iodine number 113.5 and N/P ratio of 1.3. Flour values are in between.

Extracted lipids have been fractionated by water washing, saponification, extraction with acetone, and by a hexane—methanol or carbontetrachloride-methanol-water mixture in a counter-current distribu-



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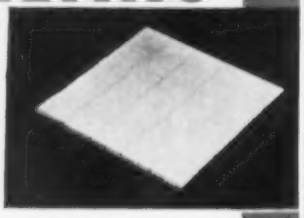

Who says *this* belting is *right* for handling your food products? We do . . . on the strength of operating tests conducted by our research department. Customers say so too, because of proven performance. Careful, continual checks of materials assure top workmanship and quality for extra-long life. Performance tests, with your products in mind, guarantee easy cleaning, no residual contamination, and no "belt-taste." That's why—with complete confidence—we recommend for *your* food handling:

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Advances in Technology

tion apparatus. When fractions are added to defatted flour, loaf volume, crumb texture, and crumb color are affected, not always favorably.

The lipids or fractions of them seem to be either necessary for, or adjuvant to, the bread-improving effect of lard. In general they are responsible for some of the stimulating and depressing effects on two of the principal and interrelated factors influencing bread quality, i.e., loaf volume and crumb softness.—*J. of Science of Food & Agr.*, 105-16, March 1957.

Instant Soup Mixes

An improved method for making dehydrated soup mixes which are easily reconstituted by addition of milk or water without coooking, is the object of a recently patented process.

Basis of invention is use of a starchy powder which appears to hold the aroma and flavor of the added vegetables during drying.

In the process, soup ingredients are cooked then mixed with a potato flour in such an amount that moisture content of the mixture never exceeds 50%. This is followed by drying at a temperature below 123F.

By adding soup ingredients at stages during drying process, a final product consisting almost entirely of these materials can be obtained. However, it is usually desirable to retain from 10 to 20% potato, and in cream soups a potato content of 22% is recommended to impart desired smoothness.—U. S. Patent 2,777,771, Jan. 15, 1957.

Sediment in Apple Juice

Apple juice when bottled and pasteurized may show appreciable sedimentation on storage, the sediment consisting of degraded phenolic constituents of the juice, protein, and ash elements.

Copper promotes sedimentation, and in juices having 22-62 ppm. sediment (dry basis) Cu content of sediment was 1.44-9.0%. Complexing of Cu with phenolic components of the juice seems to be the first step in formation of cuprous copper and oxidized phenolic components.

Phenolics concerned in sedimentation are leuco-anthocyanins and epi-catechin. The amino acid com-

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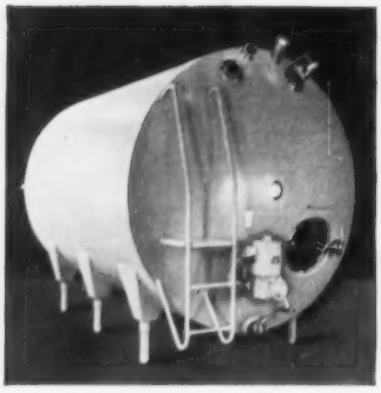
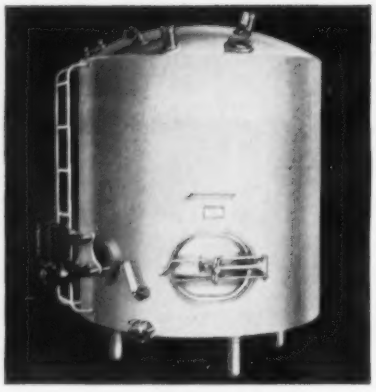


Cherry-Burrell horizontal insulated tanks for maintaining product temperatures; or with channel wall surface for preheating or precooling to reduce peak demand loads. Air or mechanical agitation. Standard capacities to 10,000 gallons. Special sizes available. Bulletin G-496.



Cherry-Burrell vertical insulated tanks for maintaining product temperatures; for preheating or precooling to reduce peak processing loads. All types of agitation. Save floor space. Standard capacities to 3,000 gallons. Special sizes available. Bulletin G-496.

Cherry-Burrell rectangular (super space-saver) insulated tanks for holding, heating and cooling. Can be arranged in banks for complete utilization of floor space. Standard capacities to 5,000 gallons. Specials upon request. Bulletin G-481.

All 6 look like storage tanks . . . BUT . . .

These Cherry-Burrell Stainless Steel Tanks are far more than mere storage tanks. They can be process vessels for handling a wide variety of liquids and semi-liquids . . . *in a wide variety of ways.* Ideal where sanitation and/or corrosion resistance is important.

For example, you can use them to provide "surge" for heating and cooling operations in continuous processing systems . . . to blend and preheat . . . to formulate and hold . . . to mix, heat or cool.

However you use them . . . or wherever . . . Cherry-Burrell Stainless Steel tanks can save you time and labor through controlled "in-tank" processing during off hours.

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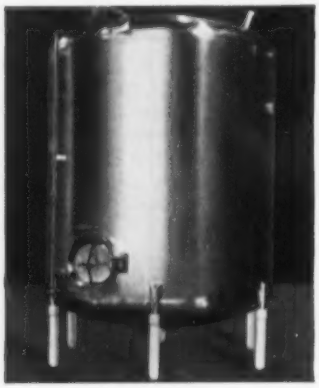
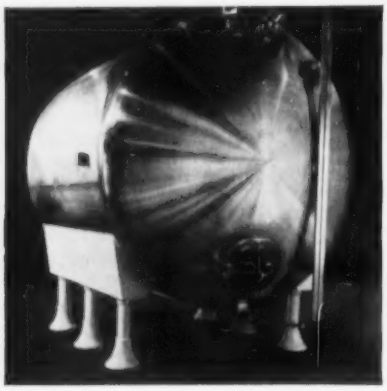
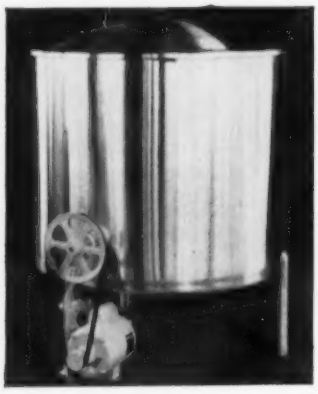


Cherry-Burrell single-shell vertical tanks. For holding, mixing or blending of one or more products. Available with or without agitation. Uninsulated. Standard capacities to 3,500 gallons. Special sizes available. Bulletin G-506.



Cherry-Burrell horizontal single-shell tanks for holding, mixing or blending liquid products such as syrups, liquid sugars, corn syrups. With or without agitation. Uninsulated. Standard capacities to 5,000 gallons. Special sizes available. Bulletin G-506.



Cherry-Burrell open-top single-shell tanks for "surge" storage, side or bottom mixing. "Reverse dish" bottom. Standard capacities from 60 to 500 gallons. Special sizes available. Bulletin G-502.

position of the deposits resembles that of beer hazes and the ash composition is also analogous to that found in beer haze, so that the two types of precipitates have certain factors in common.—*J. of Science of Food & Agr.*, 151-58, March 1957.

Low Heat Stabilizes Cloud Of High-Brix Concentrate

In preparation of 5 + 1 (58.5 Brix) orange concentrate, good cloud stability at 40F. storage temperature is attained when as little as 50% of the product is heat treated before concentration. And a temperature of 150F. is as effective as higher ones.

These conclusions are based on experiments in which 42 and 58.5 Brix concentrates were prepared from Valentic orange juice that was: (1) unheated before concentration, and (2) heated to 150, 160, 170, and 180F. Concentrates were canned, frozen, and stored at 40F. up to 6 weeks.

Cloud stability of all high-Brix samples were superior to corresponding 42 Brix ones. Heat treatment at 150F. or higher gave good stability in all high-Brix concentrate through the 6-week period.

By mixing heated and unheated 68 Brix concentrates and cutting back to 58.5 Brix with unheated juice it was found that only 50% of the evaporator feed needed to be heated to 150F. to assure stability.—*Food Tech.*, 96-99, Feb. 1957.

Grading Pectins for Jam

When used for jelly manufacture, pectins are standardized in terms of sugar required by unit weight of pectin to form a standard jelly of 65% soluble solids with a 23.5% sag measured by the Ridgelimeter.

In the US it is customary to use the "acid-in-glass" method, in which 2 ml. of 48.8% tartaric acid solution is placed, in a jelly glass and the hot pectin-sugar solution containing 65% solids is poured into it. This method does not always give the same "grade" figure as the "acid-in-boil" method of the British Food Manufacturers Industries Research Assn., in which the acid is mixed with the sugar and pectin solution before boiling it to 70.5% solids.

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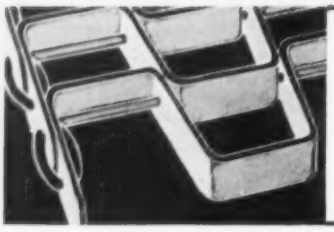

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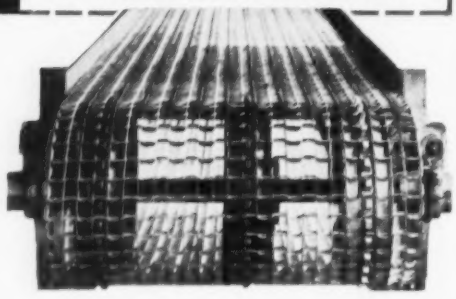

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Advances in Technology

By addition of either fruit juice, or the detergent Teepol, the acid-in-boil method is stabilized and does not overgrade slow setting powder or liquid pectins. An addition of 5 ml. of 10% Teepol per kg. of gel is required.

Beet sugar has been found to give higher grade figures for rapid-set pectins by the acid-in-boil method than cane sugar, suggesting the presence of a surface-active material that increases gel strength. Such materials seem to be present also in fruit juices and in the liquid pectins. Saponins also have this effect. —*J. of Science of Food & Agr.*, 188-96, March 1957.

Bacon-Curing Brine

Producing a highly desirable red color, or bloom, in bacon, but strangely enough not in ham, sodium iodide is the critical item in a patented cure composition containing salt, sugar, nitrate, and nitrite.

Quantity of iodide used is 0.01% by weight of the salt. The composition can be used as a dry cure or as a pickle, followed in either case by the customary smoking. Preferable temperature range is 135-140F. for the smoke-house operation.

To insure uniformity of distribution of the iodide in the salt cure, it has been found desirable to use commercial iodized salt in which the iodine has preliminarily been distributed throughout the salt mass. —U.S. Patent 2,781,271, Feb. 12, 1957.

Ingredients For Curing Meats Do Not Inhibit Staphylococci

In the curing of meat, a bacterial flora is produced quite different from that in fresh meat. This is largely because of the selective effect of the NaCl used in the curing solutions.

Food poisoning staphylococci, however, are not inhibited by any palatable salt concentration. In a study of meat curing conditions, they were able to grow vigorously in ground pork containing any permissible and palatable combination of curing materials.

At pH 4.8-5.0, however, anaerobic growth of the food poisoning staphylococci did not occur even when nitrites were absent. Meat juices protected the staphylococcus, which otherwise died rapidly.

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Chemical Formula	CCl_3F	CCl_2F_2	$CHClF_2$	$C_2Cl_3F_3$	$C_2Cl_2F_4$
Molecular Weight	137.4	120.9	86.5	187.4	170.9
Boiling Pt. (°F) at 1 Atm. Pressure	74.7	—21.6	—41.4	117.6	37.6
Evaporator Pressure at 5°F (p.s.i.g.)	24.0*	11.8	28.3	27.9*	15.6*
Condensing Pressure at 86°F (p.s.i.g.)	3.6	93.3	159.8	13.9*	22.7
Freezing Point (°F) at 1 Atm. Pressure	—168	—252	—256	—31	—76
Critical Temperature (°F)	388	234	205	417	294
Critical Pressure (p.s.i. absolute)	635	597	716	495	478
Compressor Discharge Temperature (°F)	112	101	131	86	88
Compression Ratio (86°F/5°F)	6.24	4.08	4.06	8.02	5.33
Specific Volume of Saturated Vapor at 5°F (cu. ft./lb.)	12.27	1.46	1.25	27.04	4.04
Latent Heat of Vaporization at 5°F (B.t.u./lb.)	84.0	68.2	93.6	70.6	60.2
Net Refrig. Effect of Liquid—86°F/5°F (B.t.u./lb.)	67.5	50.0	69.3	53.7	43.0
Specific Heat of Liquid at 86°F (B.t.u./lb.°F)	0.21	0.24	0.34	0.22	0.23
Specific Heat of Vapor at Constant Pressure of 1 Atm. & 86°F (B.t.u./lb.°F)	0.13	0.15	0.15	0.15	0.16
Specific Heat Ratio at 86°F & 1 Atm. (k = Cp/Cv)	1.14	1.14	1.18	1.09	1.01
Coefficient of Performance	5.09	4.70	4.66	4.92	4.60
Horsepower/Ton Refrigeration	0.927	1.002	1.011	0.960	1.025
Refrigerant Circulated/Ton Refrig. (lbs./min.)	2.96	4.00	2.89	3.73	4.65
Liquid Circulated/Ton Refrig. (cu. in./min.)	56.0	85.6	68.0	66.5	88.7
Compressor Displacement/Ton Refrig. (c.f.m.)	36.32	5.83	3.60	100.76	18.78
Toxicity (Underwriters' Laboratories Group No.)	5A	6	5A	4-5	6
Flammability & Explosivity	None	None	None	None	None

*Inches of mercury vacuum.

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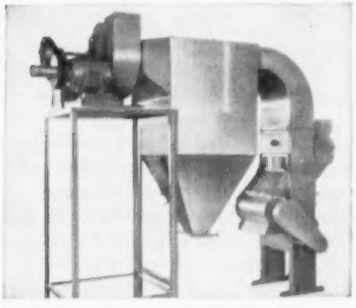

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Advances in Technology

The bacteria survived when injected into hams with the pump pickle, but were killed when hams were heated to 137 F. during normal smoking operations. Even 120F. for 48 hr. killed them in the interior of the hams, though they occasionally survived on the surface.—*Applied Microbiology*, 360-363, 1956.

Cell Damage in Frozen Fillets

The deoxypentose nucleic acid (DNA) content of the exudate from frozen fish fillets is a measure of the damage resulting from several cells followed by ice crystal formation.

When cod fillets were frozen at different rates and the DNA content of the exudate after thawing was compared with photomicrographs of sections of the frozen fillets, 3 types of damage were indicated by the peaks and the trend of the DNA-time curve.

First peak occurs as ice crystals in the muscle enlarge; the second as muscle fibers are extensively ruptured. At slow rates of freezing, with formation of large ice crystals, fiber rupture is extensive and the DNA level in the exuded juices rises again.

Damage to fillets becomes prominent at the transition from intracellular to extracellular freezing when ice columns are formed, mostly within the cells, and become so large that the cells cannot withstand the expansion. Fillets frozen from both sides show this effect. Fillets frozen at ultra-rapid rates do not undergo this damage.—*J. of Science of Food & Agr.*, 238-42, April 1957.

Wine Yeast Studies

A system for continuous growth of seed yeast in large amounts for the yeast using industries would be desirable, but the fermenting abilities of the organism are modified by aeration.

Even in batch processes, wine yeast ("Herrliberg" strain) that is grown in aerated cultures shows changes in fermenting power in grape must from day to day.

Measurements with a Warburg apparatus showed 2 or 3-day-old-yeast from aerated cultures to have about 5 times the CO_2-producing power of yeast that had been in the pure culture system for 7 days. Peaks

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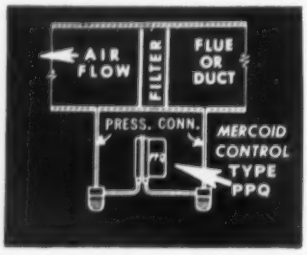
This control incorporates two pressure chambers separated by a sensitive diaphragm. Each chamber is connected to a separate pressure source and the control is set to operate as the relationship of the two pressures change.



OPERATING RANGES—6" vacuum to 6" pressure (sensitivity .03") and 30" vacuum to 30" pressure (sensitivity .1" to .2").

CIRCUIT ARRANGEMENTS—several models available to accomplish the following operations:

SPST—USING ONE MAGNETIC SWITCH—open or close switch contact either on an increase or decrease at pressure difference.

SPST—USING TWO MAGNETIC SWITCHES FOR TWO STAGE OPERATION. Open/close both switch contacts on an increase in pressure difference.

Open one contact on increasing pressure difference and one on decreasing pressure difference.

Close one contact on increasing pressure difference and one on decreasing pressure difference.

CASE STYLES—three types to meet following conditions: Indoor (general purpose), Outdoor (weather resistant), and Hazardous locations (explosion-proof).

WRITE FOR BULLETIN No. 14N

THE MERCOID CORPORATION
4211 Belmont Ave., Chicago 41, Ill.

Advances in Technology

of fermenting power were reached in about 24 hr. after starting aeration, while maximum crop was reached in about 60 hr. by which time the yeast had very little fermenting power.

In non-aerated cultures of wine yeasts, the cells have about 20% solids after the first day of growth and reached maximum of about 33% on the 6th or 7th day. In aerated cultures (10 l. air/hr./l. medium) 19% solids is reached by the time 20% of the sugar is assimilated and 31.2% solids by the time the sugars is used up completely. Maximum CO_2 production occurred when the sugar was half used.

Morphological changes in the yeast cells accompany these changes in fermenting power. Glass apparatus of 12-14 l. capacity for continuous growth of yeast was developed in these studies. — *Schweizer Brauerei-Rundschau*, 58(2), 15-19, 1957.

Pressure Brewing Process Aids Small Brewers

The Bavarian pressure brewing system was designed to offer small and medium-sized breweries some advantages of automation that are usually considered obtainable only by large-scale operations.

The mash-tub, cooker, and steam and hot water system are built in a single vertical unit. The cooker is also used for wort and mash boiling under pressure or vacuum. Utilization of mash-in and sparging water approaches 100% in efficiency. Fermentation and primary storage tanks have cone bottoms. Entire system is closed and may be operated under either air- or CO_2-pressure using gas recovered from the fermentation.

Other advantages are: Ability to sterilize closed system by steam under pressure; elimination of pumps in mash and wort lines; ease of maintaining mash temperatures since mash tub sits on top of cooker; utilization of the last spargings for the next mash; avoidance of infections through cooling and fermentation in a closed system; elimination of trub filters and centrifuges by the cone bottoms of the fermenter and primary settling tank (settled trub is returned to the next mash with a little wort).

Yeast can be washed and settled in the fermenter and beer can be transferred to racking tanks under its own pressure. Cost of the system for operations of 12 to 100 hectoliters per brew is estimated at $14,000-51,500 packed for export.—*Brauwelt* 96, 83, 1475-7, 1956.

Improved Whey Concentrate

By carefully controlling the vacuum-evaporation of whey and immediately cooling the concentrate, a product is obtained that has a smooth creamy texture and does not have the strong flavor characteristic of ordinary whey concentrate.

Concentration is carried out at a temperature above 140F. and in a vacuum greater than 24 in. of Hg. The whey may be viscolized or homogenized at any time during the process, although this step is not essential to the invention.

After the whey has been concentrated to 50-65% solids it must be rapidly cooled with agitation to a temperature below 60F. in order to prevent roughness of the product and to insure a smooth creamy texture. This cooling must be effected preferably in less than one minute.

Resulting product may be stored at 45F. It may be substituted for non-fat milk solids in ice cream mixes, and for eggs in salad dressings.—U.S. Patent 2,781,267, Feb. 12, 1957.

Vortical Separation Improves Starch

Substitution of vortical classification for screening at the 2nd-stage of the operation is a patented improvement in the wet-milling of corn to produce higher quality starch.

In operation, the mill stream flows to a screen, the oversize from which may be further ground to recover additional starch. Underflow is pumped to hydroclones adjusted to make a separation at about 60 microns.

Fraction discharged through vortex finders of hydroclones contains bulk of starch which is further treated by conventional tables, centrifuges, or hydroclones to obtain a finished product.

Fraction discharged from apex of clones is diluted with water and given a second classification, the starchy fraction of which is recycled to the screen underflow. Coarse fraction discharged through apex of second set of hydroclones may be further ground for recovery of additional starch or used as cattle feed.—U.S. Patent 2,778,752, Jan. 22, 1957.

PHILOLOGY and FILTERAIDS

Joseph Conrad speaks of words "debased by centuries of careless usage," and a glance in any good dictionary does show that many of our everyday words no longer have any clear-cut meaning. This is particularly true in the field of filtration, where many people become confused between filteraid quality and filteraid grade. This confusion is probably compounded by the diatomite industry practice of naming their different filteraids, rather than designating them by a simple direct-reading grade designation.

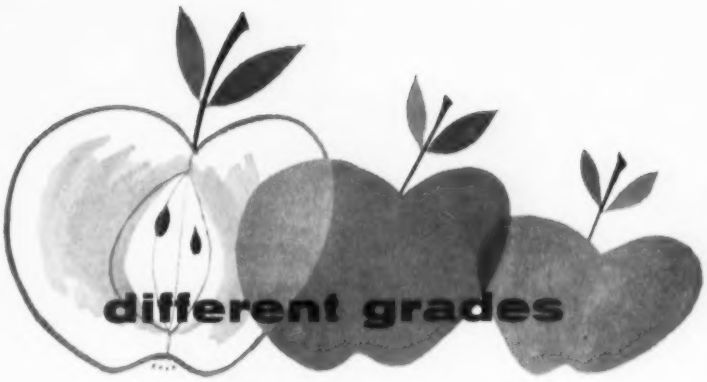
We might better talk of filteraid efficiency — the ability to give maximum throughput with consistent clarity at minimum dosage. This high performance is essential both for your product quality and to hold operating costs in line. There are many cases where the production rate of an entire plant depends directly upon the output of the filter station. And high performance is a function of *both* quality and grade.

In diatomite filteraids, quality and grade are not the same thing. Every major filteraid supplier has available a series of grades, ranging from a fine particle size grade to a coarse particle grade, with flowrate increasing and clarity decreasing as the particle size increases. This series permits matching the filteraid to the characteristic of the feed liquor.

However, filteraids from different suppliers may be equivalent in grade but vastly different in quality or efficiency. The poor quality material may develop flowrate equal to the better material but be inferior in clarity. Or, clarity may be achieved at the expense of flowrate. The most common weakness, however, of poorer quality filteraids is their inability to cope with the occasional tough batch of liquor encountered in almost every plant.

This property — the ability to handle the tough batch, at economically sound dosage — is the true test of a top quality filteraid. This characteristic is not built into a filteraid by accident. It takes sound experimental work, based on years of experience in filtration, to develop the basic information as to particle size distribution and other characteristics required in a good filteraid. And, to make this knowledge effective, quality filteraid production must be backed by control of reserves of high quality raw materials, together with milling and sizing equipment which will process the material within the very narrow limits imposed by a system of rigid quality controls. To date, this is the only known method to insure top quality in diatomite filteraids.

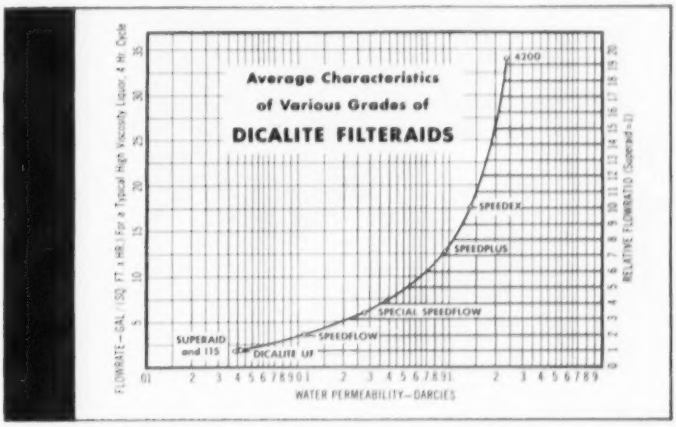
P. W. Leppla
Technical Director



...but just one quality!

Filteraids and certain kinds of fruit have this one thing in common — that *grade* is a matter of size, and has no reference to quality. The smaller fruit may be the equal of the larger in everything but size.

Filteraid quality means the highest possible degree of clarification for the grade employed, at greatest throughput per quantity of filteraid. Dicalite achieves this high quality—in every grade—by (1) careful selection of the crude diatomite from Dicalite's four high-grade deposits; (2) processing with the industry's most modern equipment, and (3) the industry's most rigid quality control system, which assures the same carefully controlled particle size range and distribution for each grade, uniformly, dependably, lot after lot. Which may explain why so many leading firms in every branch of processing have standardized on Dicalite Filteraids.



DICALITE HAS SEVEN GRADES OF FILTERAIDS
...BUT ONLY ONE QUALITY—THE FINEST!

For more complete information, write

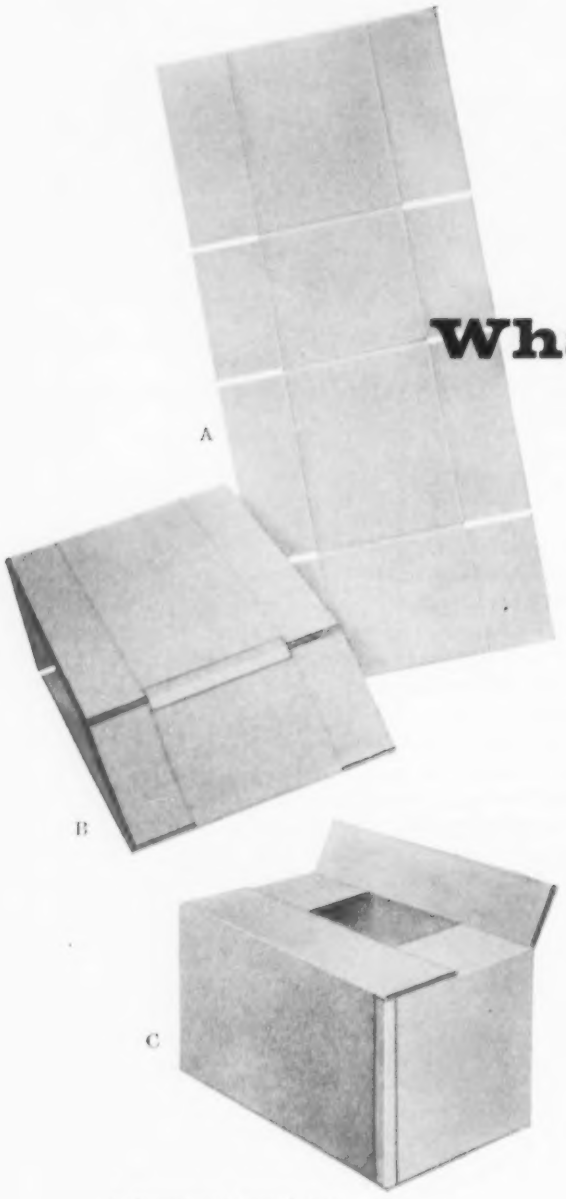
Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

dicalite division, great lakes carbon corporation 612 south flower st., los angeles, california

For more data, circle this page number on card at back →

What you should know about

What should a box



A. Scored and slotted sheet
B. Folded and taped
C. Assembled box

The "creases", or scores, on corrugated boxes facilitate folding. When straight, and properly formed, they make your packing job easier and faster, assure maximum strength and serviceability of the box.

But just being straight isn't enough. Too narrow or too shallow a score sets up internal stresses, makes the box hard to fold. Too deep, weakens the board, makes the fold easy to tear and come apart during shipment.

What makes a perfect score?

Scoring the sheet

It depends largely on the thickness and type of board, the scoring process, what you are shipping, and how it is shipped. First, the score must fold without cracking the board. It must also fold straight, regardless of the direction of the corrugations. It must not cramp the inner liners too much when folded at 180°. And it must, under test, withstand

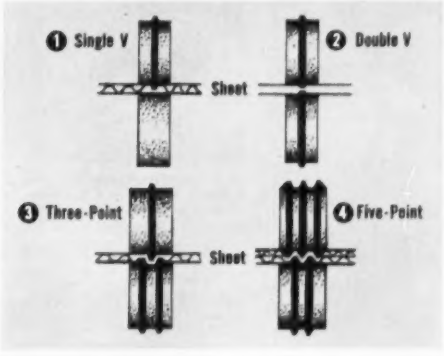
scoring and slotting of Union Boxes

"crease" be...besides straight?

combined tearing, bending and tension forces simulating those it will meet in actual service.

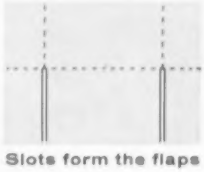
The different kinds of scores

There are four basic methods of scoring corrugated board. 1. The "Single V" crease—most commonly used when the direction of the score is parallel to the corrugations. 2. The "Double V"—generally used *across* the corrugations and where a clean, good-looking fold is essential. 3. The "Three-Point" crease — good both "with" and "across" corrugations. Used where high tearing strength is paramount. And 4., the "Five-Point" crease. This, too, scores both ways. It is used almost exclusively for double wall board.



The importance of slotting

Slots, cut by razor-sharp knives, form the top and bottom flaps of your corrugated box. Each slot must cut to an exact width, and at right angles to the flap scores so that the folded flaps will be perfectly parallel where they come together. The knives must cut a clean slot, without ragged edges or "lint". Improper slotting can seriously impair the appearance and protective qualities of your finished box.


Slots form the flaps

At Union, slotting and scoring of corrugated containers is an exact science. It's one small part of Union's complete structural design service to assure you maximum product protection. It's one of the reasons why Union-engineered boxes are used consistently by shippers in every industry.

union camp

Write for Union's free, informative booklet "Manufacturing Sheets for Corrugated Boxes."

UNION BOXES

UNION BAG-CAMP PAPER Corporation
233 BROADWAY, NEW YORK 7, N. Y.

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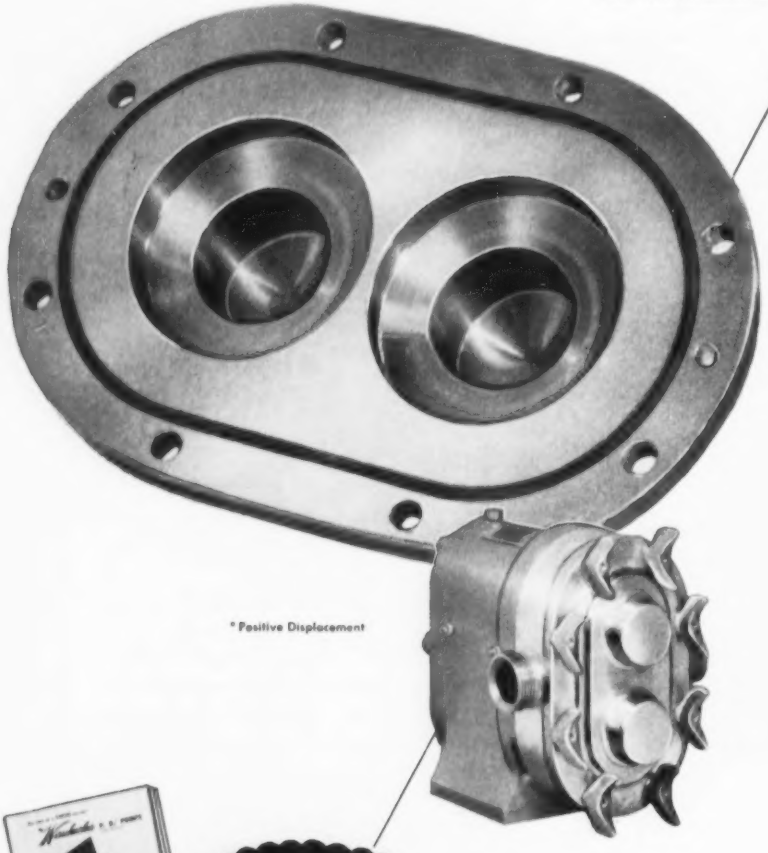
Western Division—4545 W. Palmer, Chicago, Ill.

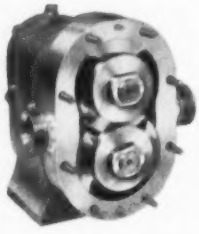
For more data, circle this page number on card at back →

Now a durable O-Ring replaces fragile, fussy, paper head gaskets in WAUKESHA P. D.* Sanitary Pumps

Call it an O-Ring or an *Oval*-Ring . . . it still means lower maintenance costs and the last word in positive and complete vacuum and pressure seal without excessive tightening of the pump head. Pump alignment is always perfect. The new Oval-Ring fits a precision-machined groove in the new pump head, easily removed for cleaning, easily replaced — and you use it over and over again. No paper gaskets to renew every day. Durable, resistant to wear, it is not subject to action of dairy, food or chemical products. Nor can it affect flavor.



* Positive Displacement



The newly designed twin blade impellers provide better distribution of the load factor at all speeds and pressures. WAUKESHA pumps operate successfully against head pressures up to 150 PSI and vacuums up to 27 inches of mercury.

As a complete prevention against air or product leakage, WAUKESHA has developed an additional O-Ring which fits below a stainless steel sleeve on the shaft. A pin fits a slot in the sleeve so that sleeve and shaft rotate together.

New optional mounting design provides inlet and outlet ports in a vertical position. Facilitates flow of heavy, viscous products. Reduces the number of costly sanitary fittings used in the inlet and outlet lines.

Just off the press — the 1957 Bulletin describing all WAUKESHA Sanitary Pumps. Send for it — Today.

ONLY Waukesha gives you a quarter century's experience and reliability

Remember — "WAUKESHA" is another word for dependability.

Waukesha FOUNDRY COMPANY

Dept. No. A-6

WAUKESHA, WISCONSIN

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QUESTIONS & ANSWERS

THIS MONTH'S PROBLEM

Buying New Equipment

Question—I am the engineer of a small processing plant located in a predominantly agricultural area. Supervision and management here are quite conservative, and tend to be suspicious of new equipment or processes which they have not actually seen. From talking to salesmen, I feel sure that I can introduce at least two or three modern pieces of equipment that would improve our products and reduce costs.

However, I am unable to convince our manager that he should approve the money for purchase of these units. Perhaps some of your readers may have encountered similar frustration, and may have found a formula for solving my problems. If so, I'd like to learn about it.

APRIL PROBLEM

Frozen Spinach Souffle

Question—Do you have formula and instructions for making a top-quality frozen spinach souffle?

Answer—Cook in a steam-jacketed kettle (to make a white sauce) 3 lb. of butter, 3 lb. of pastry flour, 24 lb. of milk, and 9 oz. of salt.

Beat, until creamy, 4½ lb. of egg yolks. Add a small amount of white sauce to yolks, mix and introduce into sauce batch. Continue cooking until yolks are thoroughly heated.

Now add to batch 24 lb. of cooked, pureed (or chopped) spinach, along with ¾ lb. of grated onions. Remove batch from kettle and add 3 lb. of bread crumbs. Whip up 9 lb. of egg whites and fold into hot batch.

Fill into aluminum trays, bake, cool, and freeze.

Re Spaghetti, Meat Balls

Here's a suggested spaghetti and meat ball formula, in response to your March problem.

To prepare meat balls, blend: Raw beef, 200 lb. (braised, 140 lb.); bread crumbs, 23 lb.; garlic powder, 4 oz.; pepper, 8 oz.; water, 3 gal.; salt, 6 lb.; and onion powder, 1½ lb.

Shape the mix into meat balls in a forming machine that can be adjusted for various sizes. Give the meat balls a quick braise in hot fat or oil as well as under infra-red lamps (if available).

Sauce usually varies in flavor according to area in which meat balls and spaghetti are to be sold. Suggested are these two formulas:

Sauce *formula* No. 1—Tomato puree (sp. gr. 1.035), 27½ gal.; water, 82½ gal.; salt, 19¼ lb.; sugar, 5½ lb.; onion powder, 8¼ lb.; and pepper, 11 oz.

Sauce *formula* No. 2—Tomato puree (sp. gr. 1.035), 20 gal.; wheat flour (soft), 15 lb.; salt, 12 lb.; onion powder, 2 lb.; parsley flakes, 1 lb.; pepper, 10 oz.; garlic powder, 10 oz.; celery seed, 1 oz.; marjoram, 1 oz.; sage, 1 oz.; suet, 20 lb.; and water, to make 110 gal.

Amount of spaghetti to be used in the formula is 160 lb. semolina (dry). This spaghetti will double in weight during blanching, and take up approximately 50% more weight during thermal processing.

Spaghetti is blanched for about 8 min. in 212-F. water, to which 15 lb. of salt is added for every 150 gal. of water. It is gradually added to the boiling water so as not to lower water temperature too rapidly and to prevent the spaghetti from matting.

Fill weights for 401x211 cans (16-oz. net weight) vary slightly, depending upon consistency desired and size of meat balls.

Here's an example of fill weights: Braised meat balls, 4¾ oz.; blanched spaghetti, 4 oz.; and sauce, 7¼ oz.

Processing times and temperatures are 55 min. at 250 F., 60 min. at 245 F., or 65 min. at 240 F., with an initial temperature of 140 F.—*Phillip J. Brady, Food Technologist, Vancouver, B. C., Canada.*

Meat Color Problem

Question—What causes ground meat, made into patties or meat loaf, to turn a brownish red upon cooking? The meat has the appearance of being rare, and no amount of cooking will brown it. We don't use any preservatives. Is it possible that our supplier is using a chemical wash on questionable cuts?

Answer—There are two possible reasons why the meat cooks to a brownish red color. One is, as you suggest, a sulfite solution may be added to the meat to bleach it to a good-looking red color.

Other is the possibility of sodium-nitrite contamination from cured meat products. This can take place in a room where the meat is ground in the vicinity of cured products. Just a small amount of airborne nitrite falling upon ground meat will fix meat pigment so that it won't turn brown upon cooking.

Caramelizing Honey

Following is our solution to your problem, "Honey Caramelizing," (FE Mar. p. 178). It is based on work carried out in heating and concentrating honey—without caramelization—in our continuous Turba-Film evaporator.

Honey is fed to the unit at room temperature, or it may be pre-heated to the vapor temperature. Entering the feed inlet, it is whirled by vertical rotor blades against heated walls in a uniform, turbulent film approximately 0.03 in. thick.

This continuous turbulent action prevents localized overheating. And because the honey is also heated to the desired temperature—with no

HOW TO DO IT?

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise). We pay space rates.

JUST ASK US

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

elevation in boiling point due to absence of hydrostatic head—in a matter of seconds, caramelization or overheating is reduced.—*Calvin L. Rasmussen, Sales Engineer, Rodney Hunt Machine Co., Orange, Mass.*

Discolored Labels

Question—Our sales and advertising departments have come up with a very striking can label with a great deal of white backbround. However, by the time our canned products are on the store shelves, the top and bottom edges are frequently marred by grayish-looking marks that greatly detract from appearance.

Needless to say, it is important to us to eliminate this condition as rapidly as possible. Your advice on corrective measures will be much appreciated.

Answer—The marks are probably "chime marks", caused by the chime of one can rubbing against the label of an adjacent can. This is a common occurrence and, unfortunately, a difficult one to control. However, certain measures can be taken to minimize it.

First, make a very careful check of the dimensions of your shipping cases, and compare them with can dimensions. One of the commonest causes of chime marking is use of cases that are larger than necessary. Too large a case permits excessive rubbing of cans against one another during warehousing and shipment. If necessary, reduce the shipping-case size to the practical minimum that will still permit casing operations. This alone may go a long way toward correcting the problem.

Second, do a *thorough* cleaning job on all can runways, elevators, conveyors, and handling equipment where chimes might pick up dirt or grease. Absolutely clean can chimes can make a light mark (somewhat like a lead pencil), but obviously the condition is greatly aggravated when chimes are dirty.

After this cleaning, it will be necessary to set up a regular cleaning schedule so that the can-handling equipment can be kept free of further accumulations of dirt. The frequency will have to be determined for your particular plant by observation and experience, with a practical balance struck between cost and label appearance.

One final suggestion: Make a survey of competitors labels to determine extent of chime marking on them. When you do so, *look for label designs that help to camouflage these markings, such as colored stripes at the ends.* This may help your art department to work out a modification of the label that will still have selling appeal and, at the same time, not show the few unavoidable chime marks too plainly.

Q.—How can we prevent our jar-packed, vinegar-pickled pigsfeet from becoming faded during storage?

A.—You might try stabilizing the color by adding 0.7g. of ascorbic acid per gal. of vinegar pickle.

Handling Shortening

In reference to your shortening-handling problem (FE Apr., p. 205), your readers might be interested in our machine—a high-speed mixer—which eliminates this difficulty.

Entire mix, except shortening, is discharged from a ribbon-type mixer into our high-speed finisher mounted directly underneath it. Shortening is introduced in liquid, cube, or pellet form by metering or preweighing. It is then speedily and thoroughly integrated to produce a smooth cake mix.—*Edward W. Weiler, The Strong Scott Manufacturing Company, Minneapolis.*

Double Problem

Question—Since our highly skilled macaroni-department foreman retired, we have been plagued with problems. Most troublesome is rough, whitish products from our short-cut line. Another is difficulty in properly drying them.

We are not sure of the causes. Nor do we know whether there is any connection between the two. Could you suggest what might be happening? And what we can do to overcome it?

Answer—As you probably realize, macaroni products can spoil by drying too fast or slow. Correct rate depends upon temperature and humidity conditions inside the dryer. Or, to put it another way, upon dry-bulb and wet-bulb temperatures of air circulated through dryer.

Unquestionably, long experience can be most helpful in setting steam valves, air dampers, and air circulating fans so as to achieve satisfactory drying conditions. It is regrettable that often the experts with this specialized experience are not successful in training successors to duplicate their performance.

One thing you can do is equip your dryer with dry-bulb and wet-bulb automatic temperature controllers, preferably of the recording type with 24-hr. charts. Connect the dry-bulb instrument to operate steam-control valve on heater coil of dryer section. A suitable air- or electric-operated steam valve would be required. To hold down cost, a fairly simple on-off type of controller might be satisfactory.

Q.—What is general practice in chilling of beef sides in a cooler.

A.—They're cooled from 100-106 F. to 40-60 F. within 18 hr.

You'll also want to regulate wet-bulb temperature, which controls the amount of moisture in the air and, therefore, rate of drying. Primarily, it is this *rate* you are interested in, but it has to be indirectly maintained by control of air conditions.

Wet-bulb instrument should be set up to operate suitable motors which, in turn, position air dampers. For example, if the air becomes dryer than desired, this would signal the dampers to shut off fresh air and recirculate more air inside the dryer. Thus, the air would get wetter, and drying rate would slow down.

Once you have your instruments, you will probably have to make some experimental runs under varying conditions of wet- and dry-bulb temperatures. And you'll have to check product quality in each case. When right set of conditions has been found, you will then be able to instrument-duplicate them at will.

You might find the services of a consultant helpful at this stage.

White rough product you mention could possibly come from using too dry a dough in an effort to hasten drying. With proper instrument control on dryer, you should be able to use a normal amount of water.

YOUR PRODUCTS SCORE HIGH

FROZEN FRUIT

Minimizes oxidation and dessication; holds natural color, shape, appearance of fruit.

CATSUP

Retains brightness of natural color; retards unsightly oxidation; enhances natural condiment flavors.

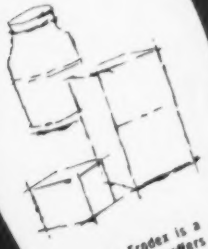
MEAT PRODUCTS

Retains natural color, reduces shrinkage; is excellent moisture conditioner.

CE CREAM

Improves flavor, texture, appearance, heat shock tolerance, solids content.

DRY FOOD MIXES



Because Frodex is a dry product, it offers many benefits to the dry food manufacturer.

CAKES AND PIE CRUSTS

Increased volume, improved appearance, finer grain, smoother texture, longer shelf life; better pie crust color and flake.

when you use

FRODEX

CORN SYRUP SOLIDS

The natural advantages of the ingredients you use are exploited for the highest score when you include FRODEX corn syrup solids. It offers tangible benefits because it is unique in the way it enhances and improves the important qualities of flavor, appearance, stability and shelf life to a wide variety of food products.

Odorless and tasteless, FRODEX—product of an exclusive patented process—holds and "sparks" other flavors and supplies reducing sugars without introducing excessive sweetness.

There are many ways of improving your score with FRODEX; our Technical Service will gladly assist you without obligation.

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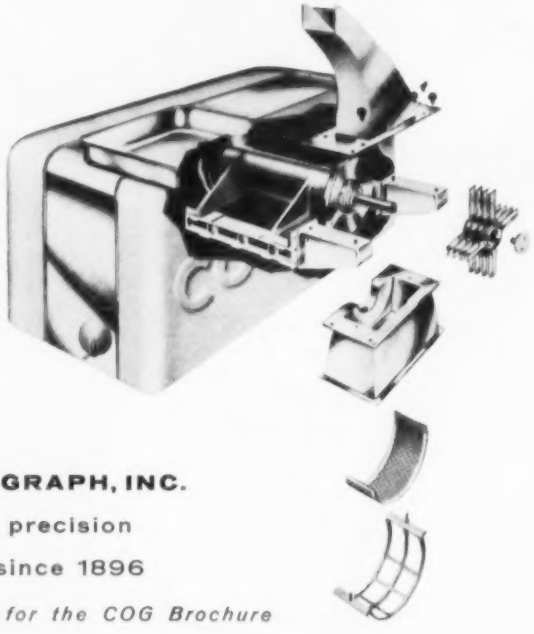
- Only four sheaves give twelve speeds, with full HP at each speed.
- Life long alignment of bearings.



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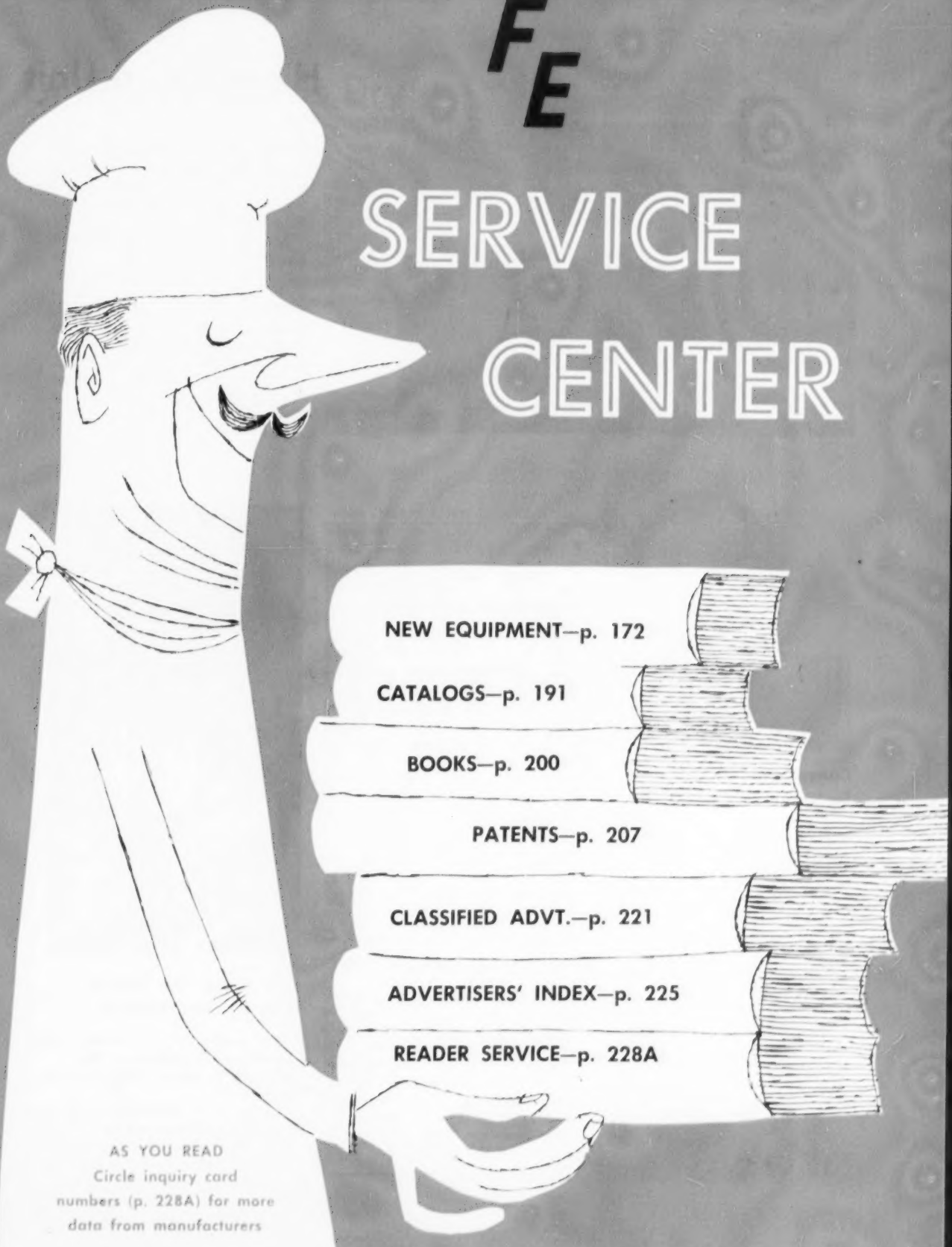
FE SERVICE CENTER



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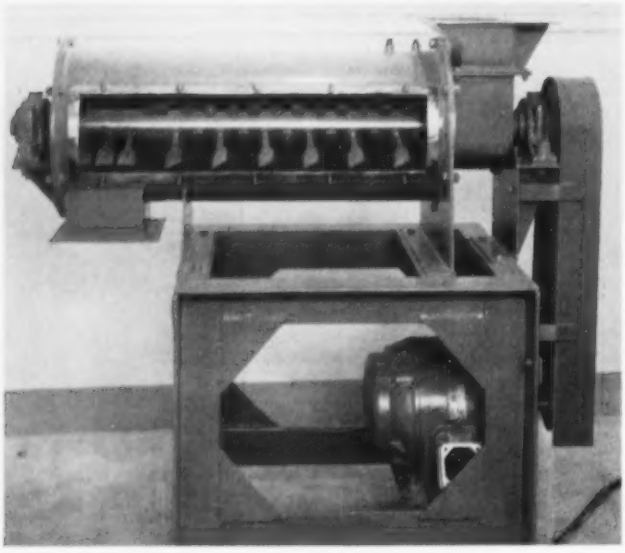
Circle inquiry card numbers (p. 228A) for more data from manufacturers

NEW EQUIPMENT & SUPPLIES

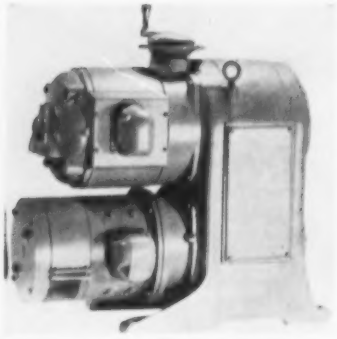


High-Speed Unit

Compact and sanitary, this continuous mixer reportedly solves the problem of breaking up and dispersing small agglomerates in dry and semi-dry mixes.

Known as Turbulizer, this unit was originally designed as a finisher for bakery premixes such as cake, waffle, and pancake mixes. Here, it effectively disintegrates case-hardened pellets of fat to produce a highly uniform blend. Other applications include blending of chocolate, dry milk, and similar products.

Furthermore, unit may also be used to fluff dry powdery materials,



Converts Induction Motor To Variable-Speed Drive

With use of this device, any standard NEMA induction motor (3-phase, a.c.) may readily be converted, in place, from a fixed-speed machine to a variable-speed drive.

Called Varidyne Power Unit, it consists of a constant-speed a.c. motor with variable-speed transmission and alternator. It is connected to the induction motor's leads to transmit the variable-frequency current it generates. Speeds are changed at the unit by means of a handwheel, or remotely by mechanical or electrical controls.

When several motors of the same rating are thus connected, each changes speed equally and simultaneously.

This technique is termed particularly beneficial where limited space, weight limitations, or environmental hazards preclude use of other types of variable-speed drives. Units handle a total connected load of 1-50 hp., with speed variations up to 5:1.

A new modification of this system, which permits soft starts, inching, and jogging of the drive motor, is termed advantageous for web drives and other applications requiring adjustable acceleration. Here, control of starting torque ranges 50-150%. System (Softstart) consists of a Power Unit, an exciter unit with tap transformer for control of starting torque, and one or more a.c. induction motors.—*U. S. Electrical Motors, Inc., Box 2058, Terminal Annex, Los Angeles.*

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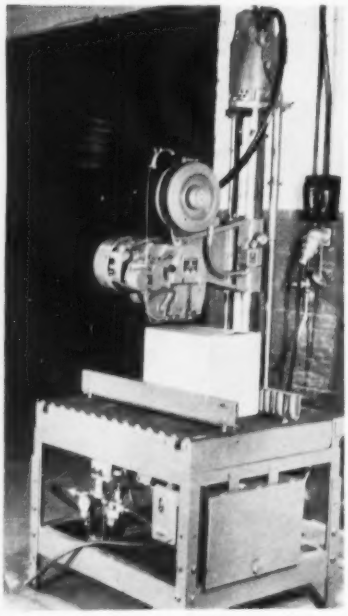
Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard — back of book. Then sign at the bottom and mail. For your convenience, too, these items are listed and keyed in the Reader Service Section.



High-Speed Unit Employs New Stitching Method

This unit rapidly closes tops and bottoms of filled fiberboard boxes by a recently developed method of circuate stitching.

In operation, stitches are cut and formed from a continuous coil of wire. Then they are driven into both outer and inner flaps, and clinched

Uniformly Blends Dry, Semi-Dry Mixes

and to quickly disperse 10-30% of liquid in a mix.

In operation, machine employs overlapping paddles that barely clear the mixer's stationary wall. They are adjustable to permit control of flow rate. Rotating at very high speed, paddles subject a product to high centrifugal force that breaks up any lumps in a mix. Any type of feeder may be used with this unit, and product can be discharged directly to a packaging-machine hopper without danger of dusting or loss of product.

Capacity of mixer varies with bulk density of product and with amount of agglomerates to be dispersed. For example, about 10,000 lb. of waffle mix may be processed per hr., whereas with other materials capacities may range 3,000-4,000 lb. per hr.

Cleaning Is Easy

In addition to efficient operation, machine's sanitary design permits easy cleaning and maintenance. The rotor assembly is the only moving part, and the machined interior of the mixing chamber offers a self-cleaning feature.

Sanitary seals around mixer shaft at both ends of chamber, and outboard bearings, further ease cleaning. Special clean-out doors provide easy access to the mixing chamber, which can be cleaned in 10 min. Unit is portable and can easily be moved and/or operated by one man.

Built of carbon or stainless steel, machine may be jacketed for hot water, steam, or refrigerant. Generally, it operates with a 10-hp. motor and V-belt drive.—*Strong Scott Mfg. Co., 451 Taft St., N. E., Minneapolis.*

Circle 172A on Reader Service Card

inside the inner flap without any mechanism entering the box. By eliminating the need for retractable clinching anvils, this machine (Model N6A17) also reduces the chance of product damage.

The method is adaptable for simultaneously closing boxes with regular slotted or overlapping flaps, sides and ends of filled 5-panel folders and 2-piece telescope-type boxes, and sides, ends, tops, and bottoms of outside containers.

Circuate stitches can be used to span the center seam of regular slotted boxes, which reduces the number of stitches required. With each stitching head driving 290 per min., up to 700 average size boxes may be closed per hour. About 13,000 stitches can be obtained from a 25-lb. coil of flat wire.

Unit is easily integrated into conveyor-line packaging systems, stitching being actuated by an electric foot trip. As container is moved by operator across the machine table, work guides automatically center it beneath the top and over the bottom stitching heads. Upper stitching unit is automatically adjusted to exact height required to close top flaps.

Machine handles boxes from 4x4 in. to a maximum of 26 in. wide and 24 in. deep.—*Acme Steel Co., 135th and Perry Ave., Chicago.*

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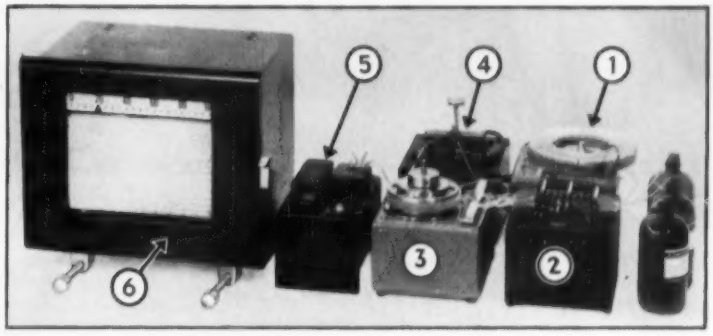


Analytical Unit Offers Continuous Process Control

Employing a unique method of automatic colorimetric analysis, this new instrument promises accurate, continuous process control. Wide application is seen for this unit since, by replacing the colorimeter component with other measuring devices (such as conductance and flame attachments), other types of determinations may be made.

Furthermore, the instrument (Autoanalyzer) drastically cuts the time required for routine quality-control checks. Now, such tests may be made in as little as 1½ min. No sample preparation is required, and there are no measurements to be made. Instead, accuracy of this method depends upon continuous proportioning of sample and reagent.

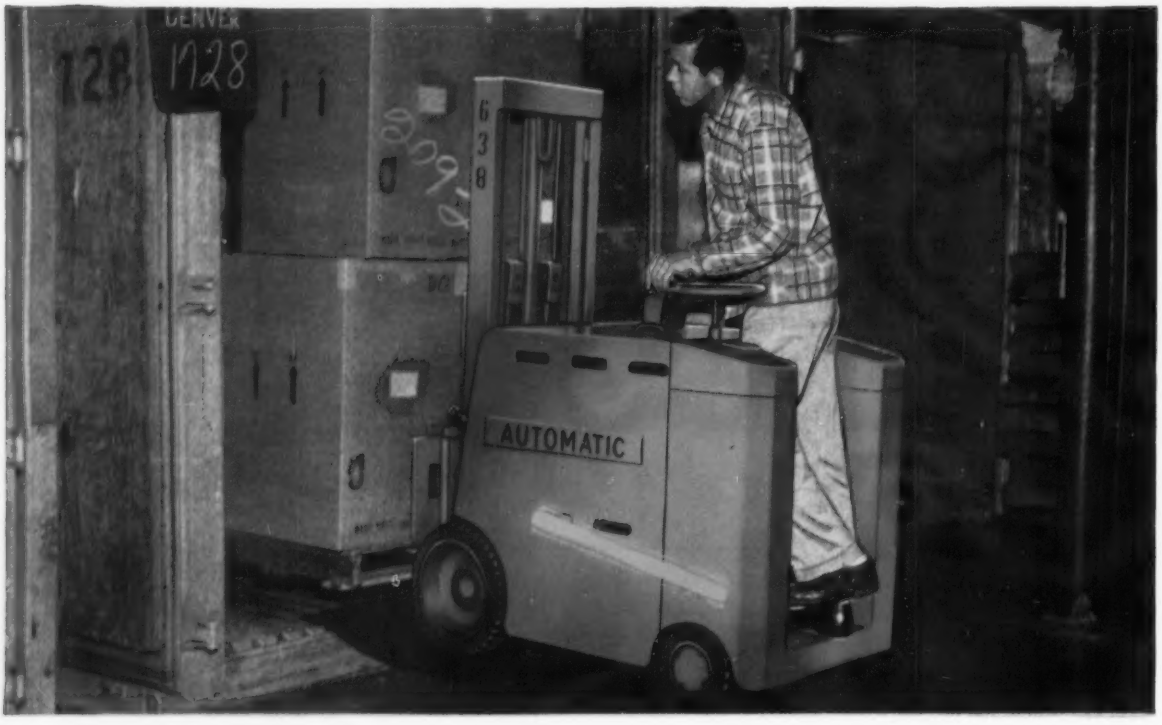
As shown in the photo, the basic unit consists of a sample plate (1), proportioning pump (2), dialyzer (3), heating bath (4), colorimeter (5), and recorder (6). When used as a continuous monitoring device, its sample plate is replaced with a tube for inserting in a tank or in a flowing stream.

In a typical glucose determination, sample is pumped into a diluent stream (0.9% NaCl), then passes through a mixing coil which assures a homogeneous sample. Next, air is introduced through a glass fitting to segment the fluid stream, which then enters the dialyzer.

Here, glucose diffuses across a cellophane membrane into a stream of alkaline potassium ferricyanide, running parallel to it on other side of membrane. Reaction mixture then

CUT OUT AND FILE

Automatic DOCKER...THE LIFT TRUCK THAT WORKS WHERE OTHERS CAN'T



Shortest in its class... unmatched for easy maneuvering...and for efficient low-cost operation

This extra-compact, more maneuverable truck offers more advantages than any other of its type for materials handling in any industry. It is especially desirable where space is limited...works with ease inside trailers and in aisles, with or without pallet racks, too narrow for other similar trucks.

What's more, direct comparison shows clearly how definitely superior the DOCKER really is. Note the figures at right.

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WORLD'S LARGEST EXCLUSIVE BUILDERS OF ELECTRIC-DRIVEN INDUSTRIAL TRUCKS

2000 LBS. WITH LOAD LENGTH OF	DOCKER 48"	TRUCK A 30"	TRUCK B 40"	TRUCK C 30"
SHORTER..... OVERALL LENGTH LESS FORK	53⅞"	65⅞"	65½"	64"
SAFER-EASY ON, EASY OFF..... STEP HEIGHT	7"	13"	13¼"	13⅞"
MORE PRODUCTIVE..... LIFT SPEED F.P.M.	65	55	45	45
MORE VERSATILE..... GRADE CLEARANCE	45%	43.4%	45%	35%
MORE MANEUVERABLE... TURNING RADIUS	56"	59"	64"	57"
MAXIMUM HEAT PROTECTION. CLASS H, SILICONE INSULATED MOTORS—ALL MODELS	Yes	No	No	No

SEND FOR DOCKER BROCHURE

Complete data on the Automatic DOCKER is yours for the asking. Just attach this coupon to your company letterhead and sign your name.

Address AUTOMATIC... Dept. H-7, 125 West 87th Street
Chicago 20, Illinois

enters the heating bath, where ferricyanide decolorizes in exact proportion to amount of glucose present. Next, sample enters a vented mixing tube, where air is released and fluid passes into the colorimeter cell.

Difference in optical density between sample and a standard is a measure of sample's glucose content. —*Technicon Co., Chauncey, N. Y.*

Circle 173A on Reader Service Card

New Sanitary Stair Tread Provides Safer Footing

Combining safer footing for personnel with maintenance savings is a new die-cast aluminum stair tread, particularly recommended where stairs are subject to extreme weathering or corrosive atmospheres.

Unit has a slip-proof abrasive nosing and requires no protective coating. Its special aluminum alloy offers high corrosion resistance and strength, and dirt won't collect in the rounded, joint-free corners.

The grating is cast in one piece, thus concentrated loads are distributed over all bearing bars. The stair withstands loads in excess of 3,000 lb. with a minimum of deflection and permanent set. Non-skid qualities result from use of fused aluminum oxide, metallurgically bonded to aluminum plate, which provides a rough front surface.

A polished finish is recommended for sanitary stairways in food plants. Tread surface is belt sanded, nosing is hand-polished, and a clear lacquer is applied to prevent tarnishing.

Units range in length from 24-42 in. Standard width is 10 in. but special widths are obtainable. Fillers or spacers are used when length dimensions are not multiples of 6 in.— *Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh.*

Circle 175A on Reader Service Card

'57 Truck Line Combines Advanced Styling, Operating Economy

Distinctive styling and a wide range of model variations mark this '57 truck line, designed for greater fuel economy and lower maintenance. Units (A-line) offer 65-in. inside cab width and 1,181 sq. in. of wrap-around windshield. Gross vehicle weights range 4,200-33,000 lb. Trucks are available in 4-, 6-, and all-wheel drives, and in conventional and cab-forward designs. Nine high-torque engines (valve-in-head, 6 cylinder) using gasoline or LPG-fuel provide 112-154 hp.—*International Harvester Co., 180 N. Michigan Ave., Chicago.*

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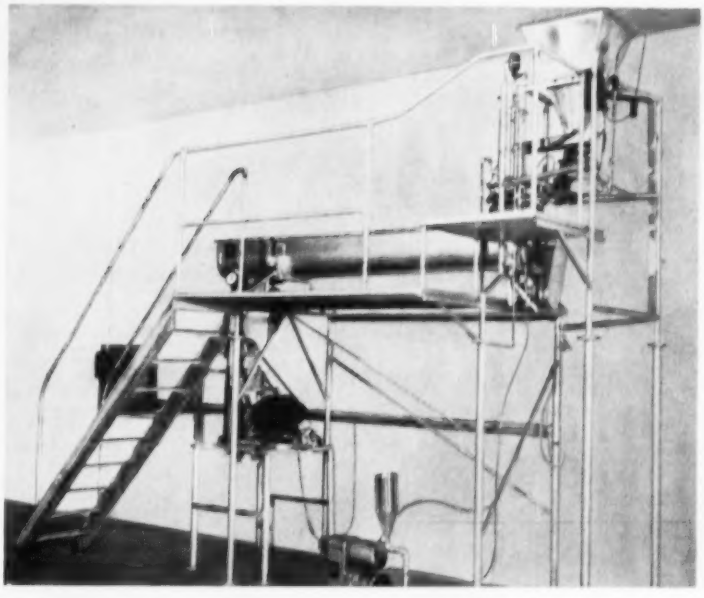

Unit Makes Powdered Foods Easily Wettable

Hard-to-mix items, such as cocoa, readily go into solution in cold or hot water when processed in this new unit.

Typical applications for the machine (Solubilizer) include wet and dry blending of wetting agents, liquid flavorings, and vitamin additives with a dry powder. Because of accurate feed, these ingredients are instantly processed, and dissimilar particles can be permanently blended regardless of after-handling effects.

In operation, material is introduced through a bin that gravity-feeds the powders through an enclosed bank of spray nozzles to atomize the solubilizing agent. Mix is then screw-conveyed to intermediate packagers at 400 lb. per hr.

Stainless unit is 12½ ft. long and 8½ ft. high. Simply operated and easily maintained, it requires 5-psi. steam, 20-psi. air, and 2 hp. The conveyor case is jacketed and heated. —*Blaw-Knox Co., Dairy Equipment Div., Mora, Minn.*

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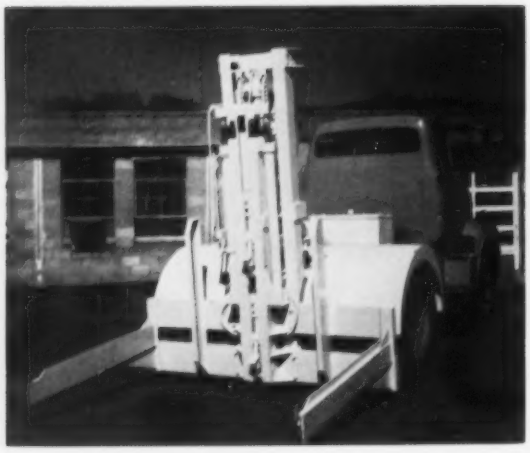


Bulk-Refuse Carrier Provides Automatic Container Pickup

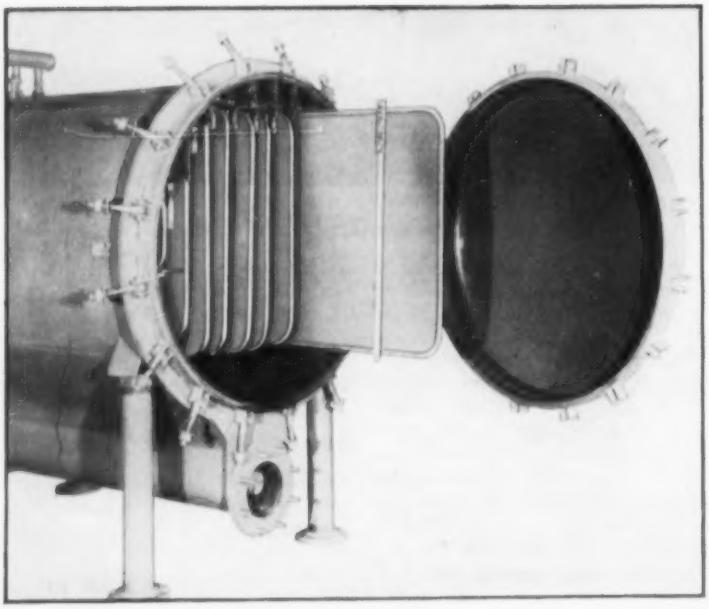
To speed and simplify your handling of bulk refuse, this new carrier combines automatic pickup of large detachable containers with high dumping for greater versatility.

Thus, without the driver ever leaving his cab, containers are picked up, hauled to disposal point, dumped, and returned—in a continuous operation that minimizes handling time. Higher dumping permits easy access to special disposal units such as gondola rail cars and bins.

Employing fork-like arms to engage lifting pins on each end of a container, the truck-mounted unit (Dempster-Dumpster, GRD 304-F-2) accommodates drop-bottom vessels with capacities to 15 cu. yd., and tilt-type containers ranging up to 7½ cu. yd. As a safety device, a solenoid-operated self-locking dumping hook is provided. Latter is push-button controlled from the driver's seat and, once a container is locked, it is secured until released by the operator.

In pick-up position (left photo), height of the unit is 9½ ft., combined overall length is about 22 ft. In dumping position, unit extends to a height of 23 ft. (with shuttle raised), permitting a versatile range of underfork clearances up to 11 ft. The carriage tilts forward 25 deg. for better load distribution in transit, and rearward 5 deg. for lower pickup of containers.

Other carriers in maker's line serve containers ranging in capacity up to 21 cu. yd., which handle payloads to 36,000 lb.—*Dempster Brothers, Inc., 7125 Shea Bldg., Knoxville, Tenn.* Circle 176A on Reader Service Card



Self-Cleaning a Feature Of High-Capacity Filter

Advance design of this self-cleaning sugar filter offers uniform precoating and flow for high capacity, while minimizing service and maintenance requirements.

Called Model RSC, it filters through vertical rectangular plates stationed on roller carriages. The door is mounted on a double-hung hinge that provides full opening to the interior. Unit may be insulated or steam-jacketed, and plates can easily be pulled out individually for inspection.

Each plate has a valved outlet with sight glass and sample cock. Thus, operator can immediately detect any single-plate failure and isolate that plate without interrupting the filtering cycle.

Cleaning is accomplished without

Simple Arithmetic...
Type 302, Sheet Base Price 50.00 cents per lb.
Type 430, Sheet Base Price - 39.25 cents per lb.
Saving 10.75 cents per lb.
in Stainless SHEET Costs!

Now you can SAVE $215 per ton in base price alone!

Many designers and fabricators who are currently using Type 302 stainless can, in numerous applications, specify Type 430 straight chromium stainless and take advantage of the 10¾ cents per pound difference in base price. Some of our customers are already saving more than $215 per ton using our 430 MicroRold stainless sheet.

The steel industry estimates that 50% of all stainless sheet applications could satisfactorily employ Type 430, the least expensive of all stainless grades, as an economical and practical material. When properly applied, Type 430 has all the desirable qualities of beauty, corrosion resistance, strength, long life and low maintenance that no other material, except stainless, can offer.

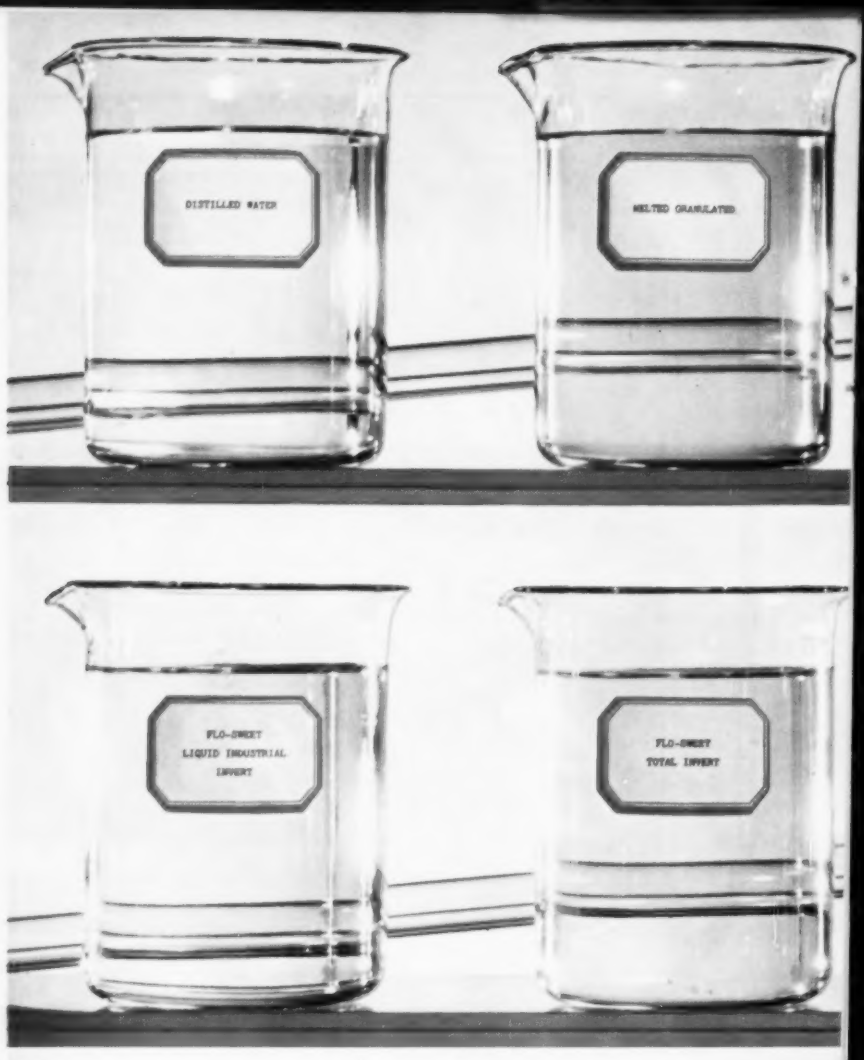
We are currently producing our MicroRold Type 430 sheets up to 48" wide in thicknesses .005" to .109" with 2B or 2D finishes; and in thicknesses .010" to .109" in No. 3, 4 and 7 finishes.

Send for Your copy, "Care and Use of 430 MicroRold Stainless Steel"

Washington Steel *Corporation*

6-W WOODLAND AVENUE, WASHINGTON, PA.

This color illustration is reproduced from an unretouched 8 x 10 Ektachrome original. The sample of melted granulated shows the color produced by a mixture of *three* commercial granulated sugars. To accentuate the colors for printing purposes, all samples were photographed in 1000-milliliter beakers; an idea of this size can be obtained from the typing on the labels. Below, a precision nephelometer is used to maintain frequent laboratory checks on Flo-Sweet's consistently lower turbidity – a further measure of refinery efficiency and liquid sugar quality.



IT'S CLEAR TO SEE...

See for yourself! This unretouched photograph reproduces the colors of the eight principal types of Flo-Sweet as precisely as possible with modern printing techniques.

Compare, if you will, Flo-Sweet liquid sucrose with distilled water. Hard to tell them apart, isn't it? Here's sugar quality you can *see!*

Note particularly the melted granulated, shown at the same concentration of sugar solids as the liquid sucrose. Compare it closely with Flo-Sweet industrial sucrose, industrial invert, total invert. Industrial types of Flo-Sweet show less color than granulated, the accepted standard of purity!

REFINED SYRUPS

YONKERS,

SERVING INDUSTRIAL SUGAR USERS EXCLUSIVELY

FLO-SWEET *Quality* IN EVERY DROP!

In Flo-Sweet amber and golden sugars, the colors—and characteristic flavors—are deliberate, and closely controlled. Note the clarity and freedom from haze.

The color of a liquid sugar is, of course, only one indication of its quality. We welcome comparison of Flo-Sweet with any other sugar—liquid or granulated . . . on any basis whatsoever: color, taste, aroma, laboratory analysis . . . or the practical test of how it performs in your own food products. You will discover what many Flo-Sweet users know through long experience: that Flo-Sweet has established exacting new standards of liquid sugar quality!

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FLO-SWEET

FIRST IN LIQUID SUGAR

AN EFFECTIVE WAY TO DEVELOP VALUABLE GOOD WILL FOR YOUR COMPANY

. . . and help to do a life-saving job at the same time

You can achieve lasting good will for your company—the kind of good will that results in friendly relations with every group in your community. And you can help to save precious lives at the same time, by putting your company's efforts behind the nation-wide campaign against traffic deaths.

During 1956, the national total of highway deaths was over 40,000—the highest figure in our history. The cost to the country of these wasted lives is incalculable.

But the picture wasn't entirely black. In many areas—in small towns and big cities—the terrible upward trend was reversed.

This was accomplished by community action—by business leaders, civic organizations, church, fraternal and PTA groups joining together with law enforcement agencies in an all-out attack on traffic deaths.

The figures prove it. Wherever people get together to do something about traffic safety, *deaths go down.*

BACK THE ATTACK ON TRAFFIC ACCIDENTS!

Your company can perform an invaluable service for your community, and for the country as a whole, by pitching in and helping in this life-saving crusade. For full information on what you can do — and how you can do it—write The National Safety Council, Chicago 11, Illinois.

Published in cooperation with
The National Safety Council
The Advertising Council

opening the filter. Cake is sluiced off by jet spray tubes, which are independently valved so that each plate can be sluiced one at a time at full line pressure. Spent cake drops into a discharge trough at bottom of tank and is removed by a slow-speed screw conveyor. This discharge can be piped directly to a disposal tank.

No bolts or fastenings are required to hold plates in place. An O-ring gasket on plate outlet seals into a flare tube opening to form a tight connection. Plates may be covered with various media, such as filter cloth or wire mesh.

Units are available in mild steel, and 304 and 316 stainless. Four models provide filter surfaces ranging 96-1,020 sq. ft., and cake capacities of 6-85 cu. ft.—*Sparkler Mfg. Co., Mundelein, Ill.*

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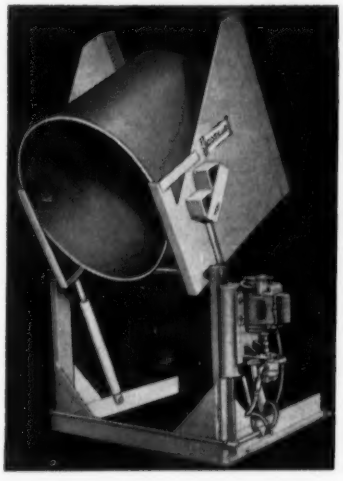

Materials Handling Eased With Hydraulic Dumper

By raising 2,000-lb. loads as much as 5 ft., this twin-cylinder hydraulic dumper cuts handling costs and accident hazards.

Typical applications include dumping of drums, vat boxes, box trucks, and specially-shaped containers. Portable unit (Tubar) is driven by electric motor that uses either a 12-v. battery or conventional power lines. —*Uhrden, Inc., P. O. Box 193, Dennison, Ohio.*

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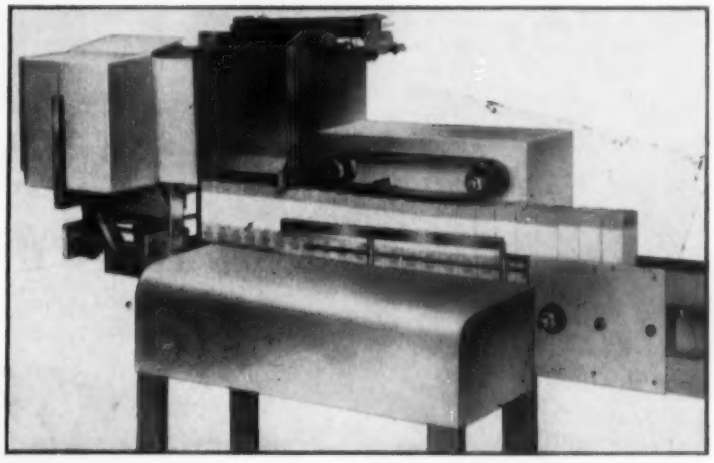

Compact Unit Provides Automatic Casing Cycle

Design simplicity, automatic operation, and package-size versatility are advantages cited for new case packers.

Available in two sizes, units (Universal Packet Casing Machines) handle rectangular cartons ranging in size from match boxes to large cereal-type packages. In addition, certain jars and cylindrical containers may also be cased.

Machine requires only one operator who opens the case, positions it, and presses a button. Then, unit selects the correct number of cartons (fed by conveyor), and elevates the batch pneumatically to make room for the next group to slide in underneath. Number of packages per batch and number of batches elevated per cycle is automatically determined by size of the shipping case employed.

When proper "block" of packages has been formed, it is ejected through a funnel and filled case is lowered onto a take-away conveyor. Machine will not eject packages until the correct number has been grouped and a case is in position to receive them.

Packer's components are readily accessible for maintenance. Changeover for package size and shape requires only simple change parts and minor adjustments. Dimensions of larger machine: Height, 4¾ ft.; width, 3½ ft.; and length, 5 ft.

Speed and stroke of all motions are adjustable, as is height of machine from floor. Required air supply is 30 psi., electrical service, 230v., 50 cycle, single phase a.c.—*H. W. Wallace & Co., Ltd., 172 St. James's Rd., Croydon, Surrey, England.*

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Liquid Level Detected By Ultrasonic Unit

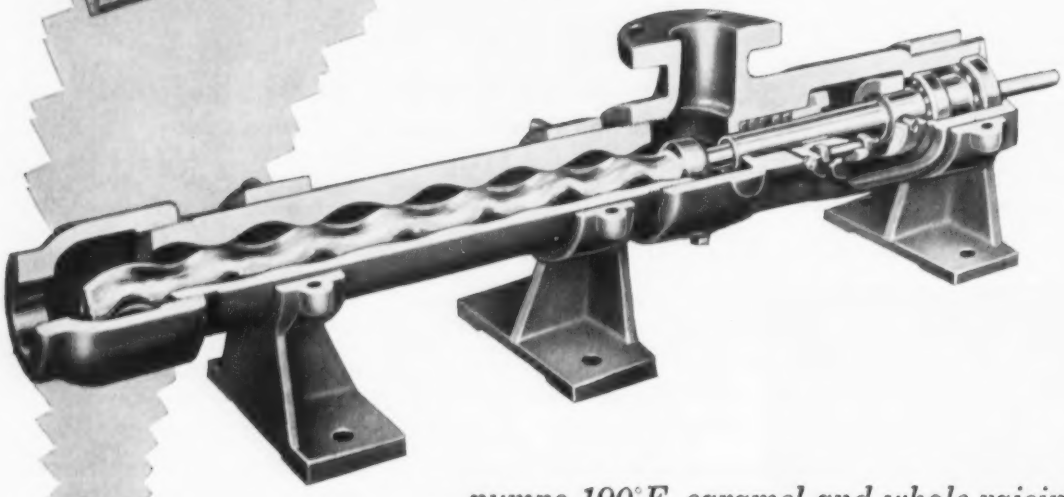
Accurate to ±$\frac{1}{32}$ in., a new ultrasonic liquid-level sensor reportedly has instantaneous response, its action depending only on the difference in impedance of liquids and air.

Unit consists of a miniature transducer mounted in a tank and an external transistorized electronic control, the entire assembly weighing 12 oz. Impervious to foam and cling-

MOYNO® PUMP

BOOSTS PRODUCTION 700%

at Stephen F. Whitman and Son, Inc.



...pumps 190°F. caramel and whole raisins

The Moyno "progressing cavity" pumping principle has enabled Stephen F. Whitman and Son, Inc. to increase production seven times over the former batch type process used in one department. The material pumped is 190° F caramel with whole raisins at viscosities from 70,000 to 135,000 C.P. This particular installation pumps 30 gallons per minute at 350 RPM driven by a 10 H.P. motor. This is but one example of the savings made possible by the 41 Moyno Pumps in use at Stephen F. Whitman and Son, Inc.

Moyno is the only pump that will handle many difficult materials such as abrasives, pastes, slurries, chemicals, foods, suspended solids, etc., without foaming, aerating, crushing or excessive pump wear.

Examine your processing methods. No doubt there are several places where Moyno Pumps can drastically cut costs. Ask us, we'll give you a prompt answer. Send us an outline of your problem today! Write for Bulletin 30-FE.

R&M

ROBBINS & MYERS, INC.

SPRINGFIELD, OHIO | BRANTFORD, ONTARIO

Motors | Fans | Hoists | Moyno® Pumps | Propellair® (Industrial) Fans

← For more data, circle this page number on card at back

ing droplets, it operates at temperatures from − 270F. to + 220F. No temperature correction circuits are required.

The probe is completely sealed in a stainless casing, thus cannot contaminate foods, and unit has no moving parts other than relay contacts.—*Acoustica Associates, Inc., Glenwood Landing, L. I., N. Y.*

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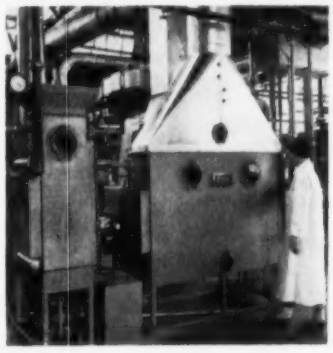


Many Applications Cited For Humidity Controller

Designed for greater versatility plus accurate, selective control, this humidity-conditioning system offers numerous applications:

Processing—Maintaining production areas at 80F., 55% R. H. or below.

Storage—Holding rooms at constant, safe temperatures and dew points.

Refrigeration—Delivering of frost-free air continuously at 32F. dry bulb or dew point, or below.

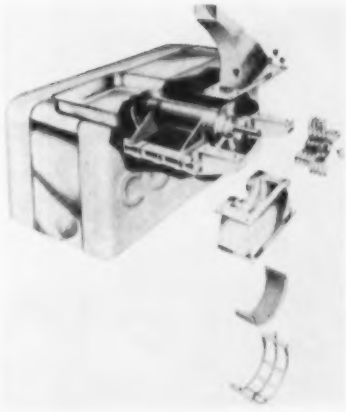
Drying—Accelerating the drying of temperature-sensitive products, such as gelatin.

Testing—In laboratory, pilot plant, and production.

Comfort and Process Air Conditioning—Controlling air temperature and humidity, while removing over 97% of airborne bacteria and mold spores.

Unit (Model "C") provides large filter surface. There are porthole-type, glass inspection doors for internal visibility and easy access to interior components. Regenerator corrosion is eliminated by nickel construction.—*Surface Combusion Corp., 2375 Dorr St., Toledo, Ohio.*

Circle 183A on Reader Service Card



Comminutor Dismantles For Easy Cleaning

Snap-apart design of this improved comminutor permits rapid and thorough cleaning of all functional parts. Furthermore, overall construction based on sub-assemblies simplifies maintenance.

Known as Impact-in-Air, units can be adopted for numerous applications—continuous size reduction of wet or dry products, spray-blending, scrap reuse, and waste disposal. Moreover, tiered assemblies provide for multi-stage operation.

Comminutor employs a reversible rotor on a splined shaft, which permits use of dual-purpose blades. Spindle is supported in an integral, line-bored housing for proper bearing alignment. Units are available in various metals or plastic, and in sizes ranging 3-300 hp.—*Motiograph, Inc., Cog Div., 4441 W. Lake St., Chicago.*

Circle 183B on Reader Service Card

INGREDIENTS

Mold Inhibitor Improved For Easier Handling

Sodium and calcium propionate, powerful antimycotic agents, are now available in non-caking form to simplify the baker's control of mold and rope.

Packaged in a new moisture-resistant container, the improved product (Mycoban) is a higher-density material, free of foreign odor, and lower in moisture. In addition to offering easier handling, it dissolves more rapidly, blends better as a dry ingredient, and does not affect flavor, texture, or appearance of baked goods.

For protection against moisture and contamination, product is supplied in polyethylene-lined drums (250 lb.).—*E. I. du Pont de Nemours & Co., Wilmington, Del.*

Circle 183C on Reader Service Card

Beverage Cloud Stabilized By Non-Brominated Agent

Alcohol- and bromine-free, this product is formulated to produce a permanent ringless cloud in all types of citrus beverages and bottled drinks.

Known as Perbro Cloud, it is used at the rate of ¼-½ oz. per gal. of flavored syrup. Agent will not fade on standing or affect the flavor of the beverage.—*Perbro Laboratories, Inc., 61-12 32nd Ave., Woodside, N. Y.*

Circle 183D on Reader Service Card

CHEMICALS

Efficient Pan Grease Cuts Baker's Operating Costs

Made of vegetable oils, this new bread-pan grease is said to clean as it greases, thus preserving both pan glaze and the tin coating.

Product (Panease) eliminates misting, smoking, and carbon buildup. After proper conditioning, it may be used for 8-10 bakings. Moreover, its opaqueness provides a visible check of performance.—*H. C. Brill Co., 375 Verona Ave., Newark, N. J.*

Circle 183E on Reader Service Card

New Enamel Eliminates Odor Pickup by Foods

This material is designed for safe painting of coolers and processing rooms—there's no need to remove exposed foods to avoid odor pickup.

In addition, product (Odorless Damp-Proof) may be applied directly over damp surfaces at tempera-

Why *concave sides* insure longer V-Belt life

With one simple test you can demonstrate to yourself why the concave sides (Fig. 1) of the Gates V-Belt insure far longer belt life.

Just feel the sides of a Gates V-Belt on the bend. Note that in bending around the sheave these sides fill out and become straight (Fig. 1-A). That means the belt makes full contact with the sides of the sheave groove; grips the sheave *evenly*.

This even contact distributes wear uniformly across the sides of the belt. Uniform wear lengthens belt life; keeps costs down.

Fig. 2

Fig. 2-A

Now make the same test with a straight-sided belt (Fig. 2) and see what happens. The sides bulge out on the bend (Fig. 2-A) concentrating wear at the points shown by arrows. Uneven wear shortens belt life; increases belt costs.

Cut V-belt replacement costs and down time. Specify belts that grip evenly and wear longer . . . specify Gates Vulco Rope — the V-Belt with concave sides.

The Gates Rubber Company • Denver, Colorado

World's Largest Maker of V-Belts

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 150

Gates VULCO ROPE Drives

Equipment & Supplies

tures down to 32F. It is available in white and a range of colors, gloss or flat finish.—*Koch Supplies, 2520 Holmes St., Kansas City, Mo.*

Circle 183F on Reader Service Card

BRIEFS . . .

Traffic Control for converging conveyor lines eliminates jam-ups by automatically keeping packages (up to 20 lb.) flowing from only one line at a time. Unit (Fergo-Merger, Jr.) can easily be installed on power conveyors and on gravity lines with sufficient pitch.—*Harry J. Ferguson Co., Jenkinstown, Pa.* (184A)

Sanitary Metering Pump prevents contact of moving parts with fluid being handled. Intake and outlet are one continuous flexible tube that passes through pump body, and is compressed by a rotary squeegee.—*Randolph Co., 1018 Rosine St., Houston, Tex.* (184B)

Heavy-Duty Meat Cutter with stainless table handles bulk meat or fish in sizes up to 20 in. high x 20 in. wide. Powered by 3-hp. motor, unit (B-20) has galvanized-steel base and aluminum upper section.—*Lasar Mfg. Co., 2540 E. 114th St., Los Angeles.* (184C)

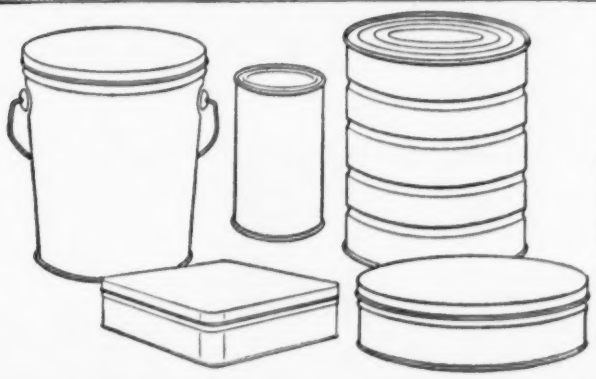
Conveyor-Line Spray Guns apply coating of silicone or other protective materials to multi-trip bottles. Treatment improves appearance of container and boosts its usable life by preventing scratching and scuffing.—*DeVilbiss Co., Toledo, Ohio.* (184D)

New Chocolate Enrobers, designed for full, bottom, half, or shoulder coating, have band speeds infinitely variable up to 24 fpm. Available in 24-, 32-, and 42-in. widths, units are readily accessible for cleaning.—*Jabez Burns & Sons, 600 W. 43rd St., New York City.* (184E)

Automatic Process Refractometer, which plots refractive-index changes in any non-opaque liquid or gas stream, checks and controls product purity, also monitors blending of two streams. Null-type instrument is designed for continuous operation on 115v., 60 cycle a.c.—*Phoenix Precision Instrument Co., 3803 N. 5th St., Philadelphia.* (184F)

PACKAGING PROBLEM

HEEKIN PERSONAL SERVICE IS BEST FOR YOU



Do you feel close enough to your metal package supplier . . . is he a part of your organization, thinking for you, planning for you, working for you? Your success is of utmost importance to us. Your continuation of business with Heekin is the goal of everyone in the Heekin organization.

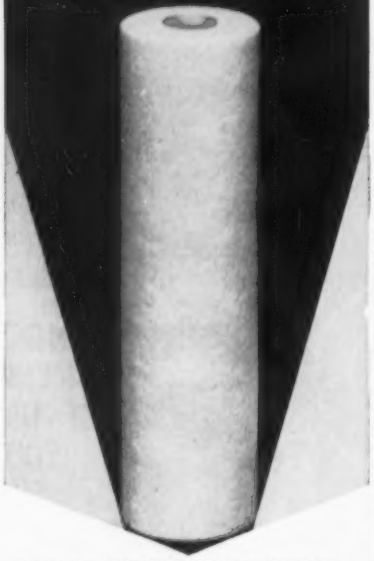
HEEKIN
Product Planned
CANS

THE HEEKIN CAN CO. *PLANTS IN OHIO, TENNESSEE & ARKANSAS—SALES OFFICES; CINCINNATI, OHIO; SPRINGDALE, ARKANSAS*

A NEW FILTER CARTRIDGE for the FOOD INDUSTRY

CUNO

MICRO-KLEAN



- **NEW 5-MICRON WHITE CELLULOSE CARTRIDGE . . .** is ideal for water, liquid food processing and all other applications where *Fine Filtration, Purity, Clarity* and complete absence from any filter-imparted *Taste* are essential.
- **LOWEST CARTRIDGE REPLACEMENT COST . . .** because Cuno's exclusive "Graded Density" feature uses the entire cartridge body for micronic filtration. Cartridge life is *doubled!*
- **A COMPLETE LINE OF STANDARD HOUSINGS . . .** for this new filter cartridge provides flow rates from a few gallons per hour to *hundreds* of gallons per minute!

WRITE NOW FOR COMPLETE INFORMATION

Send for your free copy of Cuno Micro-Klean Catalog No. 53-100.

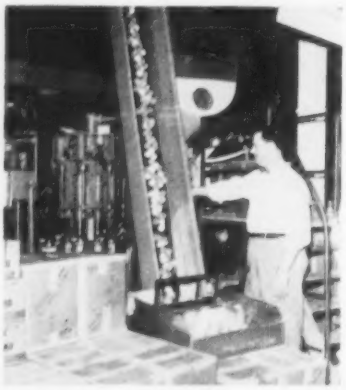
FOR APPLICATION ENGINEERING SERVICE . . . contact the Cuno Field Engineer conveniently located in your area. This specialist is fully qualified to provide the help you need to solve your filtration problems.

CUNO ENGINEERING CORPORATION

2406 South Vine Street,
Meriden, Connecticut

Filtration Engineers in Principal Cities

EQUIPMENT APPLICATIONS



Magnetized Elevator-Belt Keeps Capper Supplied

Equipped for magnetic conveying, this 16-ft. elevator belt has replaced a tedious hand operation in bottling of mustard at R. T. French Co., Rochester, N. Y.

Formerly, to supply the capper (in background), an operator had to slide cartons of caps under a conveyor line, then raise them to a platform for emptying into a hopper.

Now, however, a constant supply of caps is magnetically transferred up and over the conveyor, and automatically released into the hopper. The elevator belt is equipped with stationary elements (Magna-Rails, Eriez Mfg. Co., Erie, Pa.) that maintain a permanent magnetic field over the working surface. Caps are fed automatically from hopper in foreground.

Circle 186A on Reader Service Card

220-F. Pasteurization Ups Product Quality

Ultra high-temperature pasteurizing is boosting quality and shelf-life of dairy items produced at Willow Farm Products, Inc., LaGrange, Ill.

Reportedly the first major installation in the dairy field, this system handles homogenized milk, creams, chocolate milk, and skim milk. Processing is at 220F. with a 3-sec. calculated holding time through the pasteurizer (Rosewell UHT "Hi-Heet," Chicago Stainless Equipment Corp., 5001 N. Elston Ave., Chicago).

No off-flavors result from this treatment and there is no deterioration of texture.

Circle 186B on Reader Service Card

WHO ARE YOU?

Have you ever wondered how we, the publishers of FOOD ENGINEERING, talk about you, the valued reader, in our promotion to advertisers? The facing page will tell you. How do you feel about the way we define you? Would you write and let me know?

Grahame E. Riddell
Publisher

Enlightened management is a state of mind, wide open for ideas and information with "profit potential"

MARKETS ARE NOT STATISTICS. Markets are *men*. Markets don't just grow. *Men* make them grow. Markets don't buy anything. *Men* do.

The heart of the food manufacturing market is a certain group of *men* — enlightened management —whose training, instincts, function, power, influence all combine to make it into a living, growing, spending entity . . . a place where you, too, can grow and sell and make profits.

If men of this state of mind did not exist in food factories, there could hardly be a FOOD ENGINEERING. By their actions they make the market—and one of their actions is to reach for and read their most job-compatible magazine—*this one*, FOOD ENGINEERING.

FOOD MANAGEMENT MEN in all functions — *administrative, operative, engineering, maintenance, quality control, etc.*—follow FOOD ENGINEERING like a bird dog . . . because they have found that it alone is edited exclusively for them. "Readex" readership research confirms this emphatically. A study of five top-level articles among 489 management readers demonstrates the average interest score for all five to be a high of 55.3 percent. Nor does management live behind doors marked "Private" here. It has a broad, genuine interest in packaging, processing, all other FOOD ENGINEERING content as well—and "Readex" nails this down with every issue it measures.

NOT LONG AGO, A TOP EXECUTIVE of a large baking company said this better than we can, in a memo he sent to the operating staff of every plant . . . "*Miss one ball game, give up one date with the best girl, disappoint the wife for a night or, if necessary, take two days off the job . . . but at any cost read the current issue of* FOOD ENGINEERING."

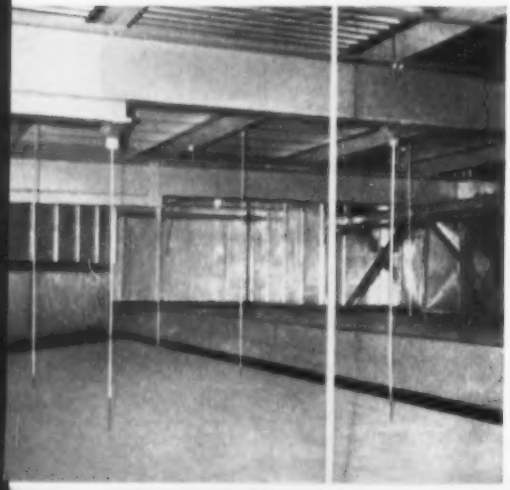
THIS, CERTAINLY, IS ENCOURAGEMENT in our continuous product improvement program . . . why management men keep finding more and more features of proved pocketbook interest in their preferred publication. The new "find-it-easier" Contents . . . the two news and trends newsletters up front . . . "Creating the Package" (attracting considerable comment) . . . the stop and shop "Service Center" in the back of the book. And, most particularly, the new "continuous flow" makeup and perfected "3-speed-reading." Never does the busy management man have to adapt himself to the magazine . . . it adapts to his needs, his time, even to the way he likes to read.

Net result . . . a reader state of mind *wide open* to any bright, profit-making ideas and information *you* have to present. For you, too, play a big part in helping management become *enlightened*.

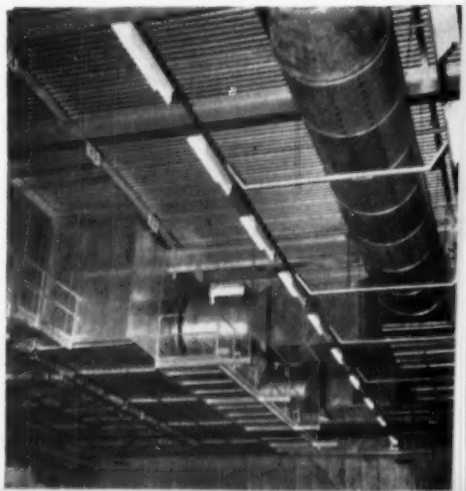
Thanks for your interest and assistance.

FOOD ENGINEERING

DIAMOND WALNUT GROWERS PLANT at Stockton, Calif., is refrigerated, air conditioned by unique York ammonia absorption system.



YORK DESIGN HELP, particularly during early planning stages, covered all refrigeration, air conditioning equipment and accessories. In picture at left, air is drawn over ribbed glass-plate brine cooler by blower at right. It is then distributed in storage areas through perforated ducts in picture at right. 500-ton York system provides accurate temperature control for entire plant which processes 70% of nation's walnut production.



YORK® PRIOR PLANNING SERVICE controls refrigeration costs by early analysis of system needs

- Major tasks assigned to today's refrigeration require major system expenditures.
- Thus, it is essential that the system incorporate its own safeguards for performance, accuracy, reliability, long life — without being over-engineered.
- York's 5-point PRIOR PLANNING SERVICE assures precise technical data on system needs early in the planning stages to help you, your consultants design a better system without costly changes later on.

No two refrigeration systems are exactly alike. The conditions vary, the job to be done varies, even the speed in which the same job is to be done often varies. Through Prior Planning Service, the York engineer can help owner, contractor, consultant on *any* refrigeration problem. By calling on his vast experience and training in refrigeration, he can provide a thorough and accurate analysis of system requirements, determine the exact characteristic of the variables which affect system design, including:

- ambient conditions
- cooling rate
- constant or variable loads
- quantity of water
- lowest temperature required
- power source
- location of engine room

Armed with this information, it is then possible to design a system that will meet the needs precisely, provide insurance against product spoilage or production downtime, allow for expansion without requiring an over-investment.

Through Prior Planning Service, the York sales engineer brings to your refrigeration problem unparalleled experience. York refrigeration system installations include the gigantic environmental laboratory for U. S. Navy, Trenton; Sunkist's Exchange Lemon Products Company, California; Carling Brewery, Natick, Mass.; Lehigh Valley Cooperative Farmers milk plant, Allentown, Pa.

You may rely with complete confidence upon the good judgment and recommendations of the York engineer. Call him *early* in your planning, or write York Corporation, subsidiary of Borg-Warner Corporation, York, Pennsylvania. In Canada, Canadian Ice Machine Co., Toronto.

PRIOR PLANNING SERVICE works 5 ways

1. **EARLY ANALYSIS** gives you all the technical data needed to make decisions.
2. **PROPER SELECTION OF EQUIPMENT.** York supplies *all* types, can be objective in recommending the equipment that is right for the job.
3. **BEST USE OF TIME, MATERIALS.** York can help the engineers, contractors and consultants on space, design specification problems, avoid costly changes later.
4. **INSTALLATION SUPERVISION.** When desired, York supervises system installation, tests and adjusts it, trains operators on how to utilize all of its outstanding capabilities.
5. **MAINTENANCE SERVICE.** When you specify York, a York Certified Maintenance Contract can also be specified assuring regular system inspection, 24-hour emergency service, all repairs, complete reports on the system's conditions.

York refrigeration air conditioning

the quality name in refrigeration

YORK B-W

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

YORK CORPORATION

SUBSIDIARY OF BORG-WARNER CORPORATION

"What are we doing about uniform quality and prompt delivery of steel containers?"

"We're getting high quality from J&L ... and they have a plant near every one of ours."

- J&L steel containers provide engineered packaging for dependable transportation and safe storage.
- J&L specialists, backed up by modern research, are ready to consult on your toughest packaging problems.
- Precise fabrication and correct specification of fittings and closures.
- Prompt dependable delivery from nine plants.
- J&L, an integrated steel producer, controls container quality from start to finish.

Call your nearest J&L Container Division office for recommendations on your packaging problems. Or write direct to the Container Division, 405 Lexington Avenue, New York 17, N.Y.

J&L STEEL

Jones & Laughlin

... a great name in steel

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JUST OFF THE PRESS

NEW CATALOGS AND BULLETINS

— Free For The Asking —

PLANT ENGINEERING

Simple Steam Traps

Contains specifications, capacities, sizes, pressures, and weights for line of inverted bucket type steam traps. Data on components also included. Bulletin 154, 4p.—*V. D. Anderson Co., Cleveland. (191A)*

Engineering Manufacturers

Pictures operations and facilities of company that engineers and manufactures a large variety of units and installations. Included among products are storage tanks and trucks. Bulletin M1-102, 32p.—*A. O. Smith Corp., Milwaukee. (191B)*

Refrigerant Applications

Covers production and properties of a line of refrigerants and their uses as cooling liquids and propellants for aerosol products. Bulletin A-1176, 40p.—*E. I. du Pont de Nemours & Co., Wilmington, Del. (191C)*

Liquid-Gas Separation

Describes device for separating entrained liquids and solids from air, gas, and steam systems. Available in three standard models with capacities up to 7,000 cfm. and 200 psi. Bulletin S1052, 10p.—*Selas Corp. of America, Dresher, Pa. (191D)*

High Pressure Couplings

Catalogs couplings for high or low pressure service in conveying air, steam, gas, hydraulic fluid, and liquids. Has notes on proper hose installation. Bulletin 115, 8p.—*Hose Accessories Co., Philadelphia. (191E)*

V-Drive Data Book

Presents description and size data on line of bushed type and fixed-bore cast iron and pressed steel V-pulleys, V-belts, refrigeration fans and pulleys, and V-drive accessories. Form F-10, 46p.—*Maurey Mfg. Corp., Chicago. (191F)*

Low-Pressure Cooling

Has many application photos of low-pressure refrigeration and air conditioning units. Discusscs equipment and services available. Bulletin 97-F, 12p.—*Frick Co., Waynesboro, Pa. (191G)*

Glass Property Data

Discusses mechanical, thermal, electrical, and chemical properties of different glasses. Curves and charts summarize data. Bulletin D-83, 16p.—*Corning Glass Works, Corning, N. Y. (191H)*

Pneumatic Specialties

Catalogs filters, regulators, lubricators, and accessories for pneumatic systems. Folder F-15-B, 4p.—*Watts Regulator Co., Lawrence, Mass. (191I)*

PVC Valves, Fittings

Catalog in color shows construction and dimensions of PVC valves. Also has temperature and corrosion-resistance table. Styles include Y-globe, and diaphragm valves. Bulletin 160-2, 16p.—*Walworth Co., New York City. (191J)*

Special Solenoid Valves

Has data on solenoid valves available with stainless steel and teflon contacting parts. 1p.—*J. D. Gould Co., Indianapolis, Ind. (191K)*

Hi-Temp Insulations

Covers line of calcium silicate pipe and block insulations for temperatures up to 1200 F. Physical properties are tabled and thermal conductivity is given in graph form. File 37-D-2, 6p.—*Ehret Magnesia Mfg. Co., Valley Forge, Pa. (191L)*

Free Literature—Fast Way

Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard — back of book. Then sign at the bottom and mail.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

Wall Conversion Chart

Lists dozens of common engineering conversion factors. Back shows company's line of steel industrial and office equipment. 2p.—*Precision Equipment Co., Chicago. (191M)*

Steel Speed Reducer

Informs on lines of concentric-shaft and right-angle speed reducers made of steel for applications up to 140 hp. Horsepower, torque

"Emulsifier" is not the most stimulating of words

The word "emulsifier" never made anybody hungry. It suggests chemistry and test tubes and great big process kettles, whereas people (even chemists) like to think of either a) Grandma by the pantry whipping up something 'specially delicious or b) *la haute cuisine*, an art form which cares not a fig about the depression of interfacial tension.

It so happens that in foods where fat and non-fat must stay united in appetite-rousing texture, the health of the sales curve usually demands a little something to reduce interfacial tension. We propose *Myverol® Distilled Monoglycerides*.

Monoglycerides have been components of human food since long before there were any chemists. In *distilled* monoglycerides there are big advantages. Because they are virtually straight monoglyceride, unaccompanied by other substances from the reaction mixture in which they are commercially produced, a very small quantity does the emulsifying job. This saves money. There is nothing to affect flavor. There is no residual catalyst to rob you of the very monoglyceride it helped produce.

If you suspect that a product of yours could use help for its stability of texture, we shall be very happy to look into it with you. We make a lot of different kinds of distilled monoglycerides for a lot of different food purposes. Write ***Distillation Products Industries,*** Rochester 3, N. Y. Sales offices: New York, Chicago, and Memphis • W. M. Gillies and Company, Los Angeles, Portland, and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

distillers of monoglycerides made from natural fats and oils

DPi

Also . . . vitamins A and E in bulk for foods and pharmaceuticals

Distillation Products Industries
is a division of **Eastman Kodak Company**

HOW! PUMP USERS!

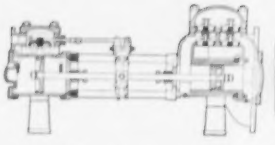
Go Modern... Go 3500 RPM

● Where *Overall Specific Speed* indicates, take advantage of the lower costs that go with modern, high speed centrifugal pumps. For any given condition, the higher the rotating speed, the smaller the pump, and the smaller the driver.

WARNING! High speeds require mechanical reliability. Dean Brothers standard centrifugal pumps are designed for 3500 RPM.

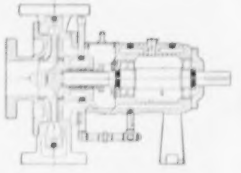
The Best is our Standard

A WIDE RANGE OF OVERALL SPECIFIC SPEEDS IS COVERED BY THESE DEAN BROTHERS PUMPS



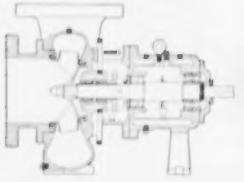
RECIPROCATING TYPE

Low Capacities and High Heads. *Indicated for Overall Specific Speeds of less than 500.*



CENTRIFUGAL TYPE

Medium Capacities and Moderate Heads. *Indicated for Overall Specific Speeds from 500 to 3500.*



MIXED FLOW TYPE

High Capacities and Low Heads. *Indicated for Overall Specific Speeds from 3500 to 5000.*

OVERALL SPECIFIC SPEED

$$N_s = N\sqrt{Q}/H^{3/4}$$

N_s = Overall Specific Speed
N = Pump Rotative Speed
Q = Pump Capacity—gpm
H = Head—ft.

● If you would like to know how *Overall Specific Speed* can help you select the proper pump, write us or call your local Dean Brothers representative.

DEAN BROTHERS PUMPS INC.
EST. 1869
323 West 10th St., Indianapolis 7, Ind.

ratings, dimensions, and load and thrust capacities, are tabled. Bulletin 1105, 24p.—*Falk Corp., Milwaukee. (191N)*

Hermetic Coolant Pumps

Treats of hermetic pumps said to provide dependable means of circulating and controlling refrigerant liquids and oils, particularly on low-temperature applications. Piping diagram and pump specifications are included. Bulletin 1256, 4p.—*Hetron Inc., York, Pa. (192A)*

Electric Heating Devices

Informs on cartridge heaters, miniature soldering irons, aluminized steel sheet strip heaters, and ceramic-to-metal hermetic seals. Valuable power requirement section shows short and long form calculations for heating applications. Catalog GEC-1005H, 72p.—*General Electric, Schenectady, N. Y. (192B)*

Joints and Couplings

Describes line of expansion joints and flexible couplings. Photos, dimension drawings and specification tables are included. Form AD-137, 14p.—*Garlock Packing Co., Palmyra, N. Y. (192C)*

Bevel Gear Units

Treats of right-angle bevel gears rated up to 5 hp. Has line drawings, tables, graphs, and application photos. Bulletin 57, 4p.—*Airborne Accessories Corp., Hillside, N. J. (192D)*

Impulse Steam Traps

Describes operation of impulse steam traps designed especially to handle heavy condensate loads. Has data list and application photos. Bulletin T-1746 (57A), 4p.—*Yarnall-Waring Co., Philadelphia. (192E)*

Pump Selector Manual

Helps select correct corrosion-resistant pump for applications up to 350 gpm. Line includes molded hard rubber centrifugal pumps, rubber-lined centrifugal pumps, neoprene impeller pumps, and gear pumps. Bulletin CE-55, 20p.—*American Hard Rubber Co., New York City. (192F)*

Worm Gear Drives

Summarizes information on line of speed reducers, worm gear sets, and special units for drive applications. Bulletin 145, 16p.—*Cleveland Worm & Gear Co., Cleveland. (192G)*

MATERIAL HANDLING

Pallet Boxes

Pictured are applications for bulk handling of fruits and vegetables in pallet boxes. Uses of these containers in harvesting, handling, storing, and shipping agricultural products is demonstrated. 12p.—*General Box Co., Des Plaines, Ill. (192H)*

Weight Indicator

Has specifications and applications of a weight indicator adapted for on-the-spot weighing of up to 5,000 lb. Bulletins 37E, 15E, 8p.—*W. C. Dillon & Co., Van Nuys, Calif. (192I)*

Lift Truck Basic Book

Tells what mechanical and hydraulic hand lift trucks are, how they operate, and how to select and use them. Attractive drawings and application photos aid well-organized presentation. 20p.—*Assn. of Lift Truck and Portable Elevator Mfrs., Pittsburgh. (192J)*

Push-Pull Loader

Furnishes data on palletless loading system utilizing push-pull fork truck attachment with integral side shifting. Bulletin 2117, 4p.—*Yale & Towne Mfg. Co., Philadelphia. (192K)*

Several Handling Aids

Describes a number of models of handling equipment including ramps, pallet stacker, and hooks. Ramp capacities run from 2 to 15,000 lb. 6p.—*Elizabeth Iron Works, Inc., Elizabeth, N. J. (192L)*

Truck and Floor Cranes

Illustrates line of cranes for mounting on truck beds or floor. Units feature built-in extension boom, 4-point suspension, variable stroke hydraulic pumps and needle-type control valve. Capacities run to 3 tn. Bulletin U-457-88, 4p.—*Uhrden, Inc., Dennison, Ohio. (192M)*

PACKAGING

37 Informative Films

Outlines actual in-plant production-line movies that are called on-the-spot records of the mechanization revolution. The 37 films include bakery, dairy, frozen foods, meats and vegetable oils, and stock products subjects. 16p.—*Marathon Corp., New York City. (192N)*

Liquid Packet Filler

Describes machine that forms, fills, and heat-seals liquids into

P&S POLVAROMAS FLAVORS MAKE FINE FOODS FINER!

There's taste appeal in every food product using spray-dried powdered flavors by P & S. There's also the benefit of locked-in flavor freshness, long shelf life and an appetite-provoking flavor of distinct quality.

Try P & S Polvaromas in your next "mix". It's the easiest way to add sales and taste to your product.

Free samples without obligation.

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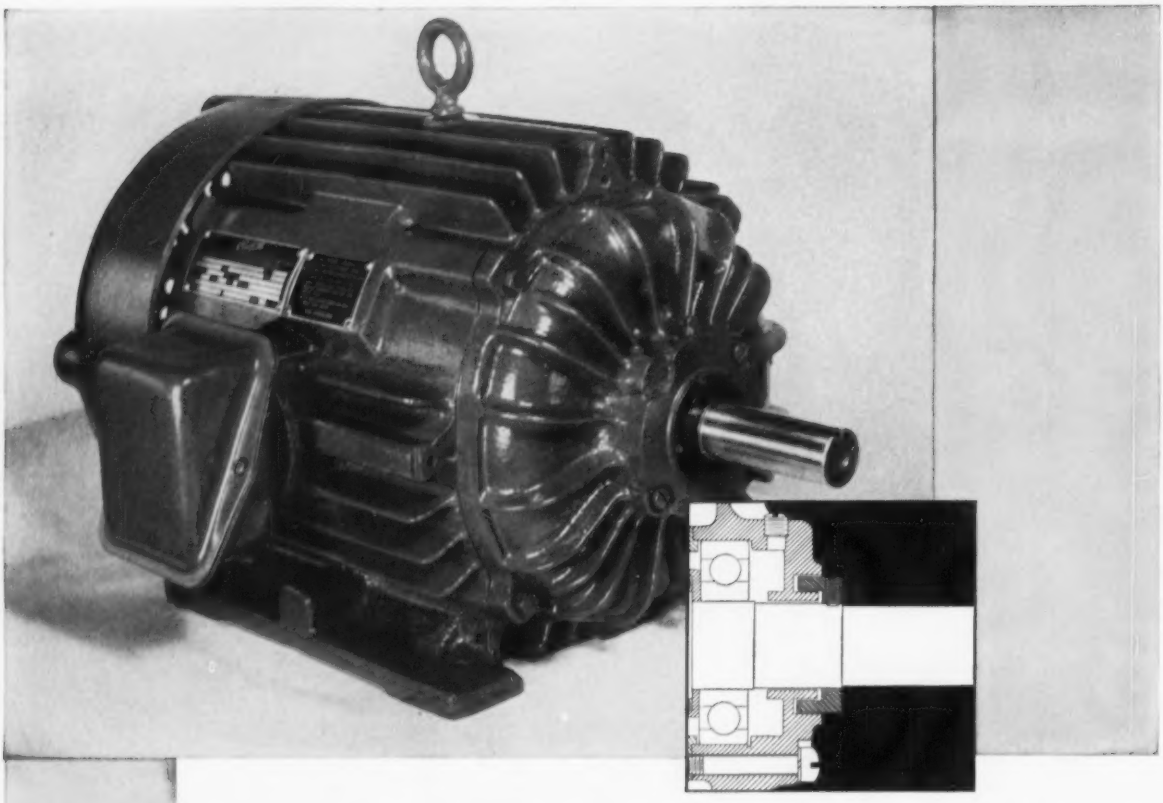

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Century TOTALLY ENCLOSED FAN COOLED MOTORS

When motor maintenance goes down, production goes up. Century TEFC Motor *protects itself* from dust, grit, chemical fumes, moisture. Shaft openings at each end are labyrinth-sealed, and there is a precision clearance between metal seal and bearing bracket.

Outside, a hose or whisk broom quickly cleans it. External fan forces jets of cooling air across the frame. Inside, vital motor parts are completely sealed off from injurious atmosphere. Factory lubrication of bearings is adequate for several years' service under normal conditions; however, whenever required bearings may be relubricated through grease plugs.

For full facts on your specific application, call the Century District Office or Authorized Distributor nearest you.

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Performance-Rated®
MOTORS
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film packets in one continuous cyclic operation. Fills up to eight packets per cycle and 50 cycles per minute with electric eye insuring registration of product with printing on both sides of the packet. 8p.—*Brown Bag-Filling Machine Co., Fitchburg, Mass. (192O)*

Three-Flavor Valve

Shows unit specially designed for company's half-gallon filler that allows bypassing three ice cream flavors without waste, if necessary, while filling half-gallon linerless cartons. 1p.—*Anderson Bros. Mfg. Co., Rockford, Ill. (195A)*

Steel Strapping Machine

Illustrates steel strapping machine for compressible or solid units. Device fits into existing conveyor lines and has push-button control. 4p.—*Acme Steel Co., Chicago. (195B)*

INSTRUMENTS

Venturi Metering Tube

Comprises drawings of Venturi tubes with stainless steel metering section. A complete Venturi and an inset style are offered. 1p.—*Vector Mfg. Co., Jenkintown, Pa. (195C)*

Potentiometer Recorders

Tables data on potentiometer units that can be used for permanent recording of up to 16 points on one chart. Bulletin F-7955, 2p.—*Barber-Colman Co., Rockford, Ill. (195D)*

Air Pollution Meter

Furnishes description of optical and electronic system used in a portable photometer for measuring and controlling air pollution. Bulletin JM-1000-C, 8p.—*Phoenix Precision Instrument Co., Philadelphia. (195E)*

Meters, Valves, Regulators

Includes photo-illustrated descriptions of a line of gages, valves, meters, regulators, and accessories. Catalog C-5000, REV. 8, 28p.—*Rockwell Manufacturing Co., Pittsburgh. (195F)*

Controlled Humidity Room

Illustrates chamber that will automatically control and record any two temperatures and humidity conditions that fall within its range. Bulletin 5670, 2p.—*Blue M Electric Co., Blue Island, Ill. (195G)*

Compact Heat Control

Diagrams thermostat available in temperature ranges up to 550F, for sterilizers, pasteurizers, and culture ovens. Bulletin RP-801, 4p.—*Robertshaw-Fulton Controls Co., Greensburg, Pa. (195H)*

INGREDIENTS

Liquid Sugars

Full color manual details liquid sugar processing. Applications are discussed and colors of the various grades of liquid sugar are shown. Explains quality factors and has charts to facilitate computing expense of installing liquid sugar system. 52p.—*Refined Syrups and Sugars, Inc., Yonkers, N. Y. (195I)*

Sugar Handbook

Describes each type of sugar by photo, grain size, color, and uses. Covers methods of handling and shipping sugar, and specifications for liquid sugars. Booklet lists density, solubility, and boiling point information of sugar solutions. 32p.—*National Sugar Refining Co., New York City. (195J)*

MAINTENANCE

V-Belt Maintenance Tips

Photos and cartoon-drawings help explain eight most common causes of V-belt destruction. Selection and matching of V-belts, correct installation, and hints for making them last longer are also included. Bulletin 20X6234C, 12p.—*Allis-Chalmers Mfg. Co., Milwaukee. (195K)*

Oil Additive Discussion

Has technical notes on types of compounds used as lubricant additives, reasons for use, and mechanism of action. Photos and charts showing effect of lubricants with and without additives are included. Lubrication No. 3, 16p.—*Texas Co., New York City. (195L)*

Multiple Feed Oiler

Explains operation of multiple feed oilers that gain accurate speed control through use of tapered feed adjustment screws. Units are available with either manual or electric solenoid control, and with a range of from 1 to 24 lubricating outlets. Bulletin 33A, 4p.—*Trico Fuse Mfg. Co., Milwaukee. (195M)*

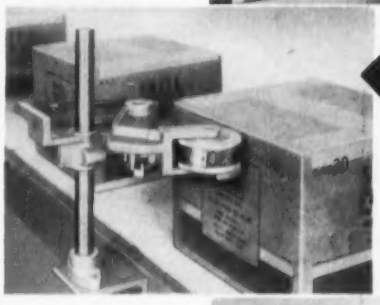
Special Zinc Coatings

Refers to a paint that can be used as a primer on galvanized iron and sheet zinc, or on the in-

Four New Ways to Code-Mark Packages

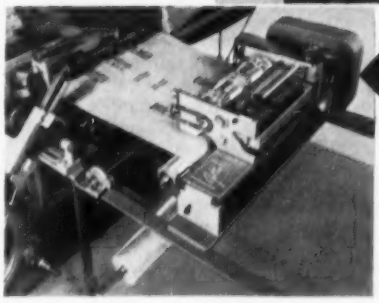
New GOTTSCHO machines fill every package-imprinting need

Top-Coder . . . imprints code-dates, other changeable legends on top surface of round or rectangular cans, canisters, jar covers, cartons, boxes. Attaches to conveyor or packaging machine. Locates imprints accurately even if container flow is irregular or intermittent.



Side-Coder . . . imprints side surfaces of folding cartons, set-up boxes, rectangular cans and canisters. Can be used to imprint codes, product identification, etc. simultaneously. Fully automatic, adapts to any mechanized production-line.

Bottom-Coder . . . portable, space-saving unit that imprints codes on bottom of jars, bottles, cans, etc. Imprint surface may be flat or concave, flush or recessed. Wheels right up to the line, can be moved about at will.



Web-Coder . . . compact attachment for wrapping and bundling machines that imprints any changeable legend up to 24" wide on the wrapper during the packaging operation. Fully automatic . . . assures precise register, consistent quality on films, foils, papers.

Write for descriptive bulletin, specifying machine in which you are interested

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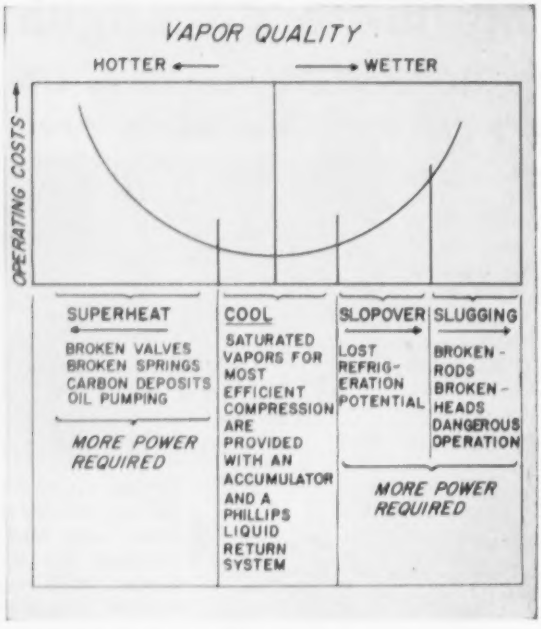
Automatic Production-Line CODING, MARKING, IMPRINTING MACHINES

In Canada: RICHARDSON AGENCIES, LTD., Toronto & Montreal

Liquid Ammonia Return Systems are Refrigeration's Preventive Insurance



Insurance at its best is insurance that *prevents* disaster. It's a much better buy than insurance which merely foots the bills while you get back in production after accidents. Phillips liquid ammonia return systems, which safeguard compressors against gulps of incompressible liquid ammonia, provide this sort of "insurance"— and it is quickly "paid up for life."

But liquid return systems are not in competition with insurance; in fact, many such systems are installed at the insistence of alert insurors who know a hazard when they see one.

Safety is a clear-cut reason for installing liquid return systems, but it is only one of several equally compelling reasons (see "VAPOR QUALITY" chart). *Economy of compressor operation* makes even more sense to the optimist ("It's a good compressor . . . How Can A Little Frost Hurt It?"). Cycling liquid ammonia through the compressor, even if it does not cause immediate damage, increases the power requirements and reduces the refrigerating effect produced. Liquid return systems by-pass liquid ammonia around the compressor and put it back where it belongs — in the evaporator. Here it can boost maximum or peak capacity of the entire system, it can raise cycle efficiency, and it permits full flooding of the evaporator coils without endangering the compressor.

Phillips liquid return systems are ruggedly built of top-quality materials, in many configurations and sizes, for a wide variety of custom-engineered installations. You will find it a simple matter to select and add the right Phillips system to your refrigeration cycle. You can make a good start in this direction by writing direct to the manufacturer for a more complete engineering discussion of liquid return systems. We give all inquiries prompt attention.

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PHILLIPS

H. A. PHILLIPS & CO.
DESIGNERS AND ENGINEERS
REFRIGERATION CONTROL SYSTEMS
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side of metal water tanks and other submerged metal surfaces. 4p.—*Tropical Paint Co., Cleveland. (195N)*

Cementable Plastic

Informs on cementable Teflon plastic sheets and tape. Thickness and weight data, installation instructions, and applications are detailed. Useful in guide rails, slides, baking pans, cookie flats, and counter tops. Form AD158, 2p.—*Garlock Packing Co., Palmyra, N. Y. (196A)*

Hose Fittings

Compiles information on hose clamps, fittings, tools, and replacement parts. Also serves as instruction and training manual. Catalog 300RG-56, 12p.—*Punch-Lok Co., Chicago. (196B)*

Maintenance Product Line

Covers 12 products including window coating, rust preventive, cleaning crystals, and paints. 6p.—*Skybryte Co., Cleveland. (196C)*

Lubrication Fitting

Describes relief-type fitting that can be attached to equipment equipped with conventional relief plugs. Bulletin BU-61, 4p.—*Keystone Lubricating Co., Philadelphia. (196D)*

One-Shot Lubricators

Details design and operation of semi-automatic spring discharge piston pump lubricator. Type L, 2p.—*Bijur Lubricating Corp., Rochelle Park, N. J. (196E)*

Screw Conveyor Bearing

Has data on ball-bearing equipment for screw conveyors. Units are designed to fit new or existing machinery with easy installation and maintenance. Folder 2489, 6p.—*Link-Belt Co., Chicago, Ill. (196F)*

Boiler Cleaning Tools

Explains and has diagrams of boiler cleaning system along with pictures of special tools for doing this job. Bulletin 137-A, 4p.—*Spencer Turbine Co., Hartford, Conn. (196G)*

Specialized Coatings

Tells how to deal with problems of painting damp walls, protecting from spillage, fungus, and odors. 4p.—*Wilbur & Williams Co., Boston. (196GA)*

MANAGEMENT

Radiation Applications

Presents information on staff and facilities of an industrial radiation center used by industry and government on both a service and a contract basis. 12p.—*Radiation Applications, Inc., New York City. (194H)*

Food Industry Progress

Comprises survey of newer aspects of the food industry including packaging, mixes, flavor, low-calorie foods, and other late developments. 36p.—*Dodge & Olcott, Inc., New York City. (196I)*

QUALITY CONTROL

Barley Quality Evaluation

Reports on research done to determine quality of various barley varieties for malting. Publication No. 13, 16p.—*Malt Research Institute, Madison, Wis. (196J)*

Lab Safety Manual

Discusses laboratory accident prevention, first-aid, and fire-fighting, available safety equipment, and information references. Bulletin FS201, 56p.—*Fisher Scientific Co., New York City. (196K)*

Electronic Milk Tester

Furnishes drawings and data on pasteurization tester that provides means for independent checks of HTST heat treatment. Bulletin LPC-512, Sheet FM-2411-82, 5p.—*Lumenite Electronic Co., Chicago. (196L)*

Process pH Electrodes

Presents photos, drawings, and data for dip-type immersion head continuous flow assemblies, and stainless steel mounting for pipeline pH measure. Data Sheet N-S5 (2), 4p.—*Leeds & Northrup Co., Philadelphia. (196M)*

Mechanical Force Gage

Covers specifications and applications of unit designed to check loads even in very limited space. Bulletin 11-E, 8p.—*W. C. Dillon & Co., Van Nuys, Calif. (196N)*

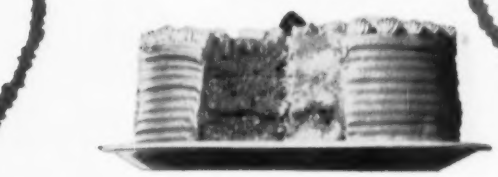
Stream Gas Chromatograph

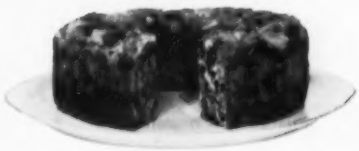
Introduces gas chromatograph designed for continuous, automatic analysis of process streams, using special sampling valves and timing system. Samples are automatically extracted from streams at intervals of 5 minutes to a half hour and accurately analyzed for up to eight components. Results are presented as diagram on strip recorder. Bulletin 802, 4p.—*Beckman Instruments, Inc., Fullerton, Calif. (196O)*

New Laboratory Items

Reports on latest lab units including stainless vacuum and pres-

Safeguard Food against Mold and Yeast Spoilage with SORBISTAT®





Here's a promise of new protection for a wide variety of food products. Extensive tests have proved that Pfizer SORBISTAT (sorbic acid) selectively inhibits the growth of many molds, yeasts and certain bacteria which cause spoilage.

Cheese and cheese products, prepared gelatin, fruit, vegetable, and other salads, and fruit cake are some of the foods for which sorbic acid protection has been evaluated and found effective. The protective value of sorbic acid in pickles, soft drinks, pie fillings, and chocolate syrup is now being carefully analyzed. Reports indicate that in certain cases, sorbic acid is several times as effective as other antimycotic agents now in use.

Most important, since SORBISTAT is a selective growth inhibitor of yeasts and molds, it does not interfere with the normal microbiological curing of cheeses. At normally effective use levels SORBISTAT does not affect the appearance, taste or odor of any food product. It is a stable, easily stored, white crystalline powder that's added to foods as a powder or as an easily prepared solution.

Discover for yourself how SORBISTAT can keep your foods in better condition... and your customers better satisfied! Write for technical literature and sample today.

Quality Ingredients for the Food Industry for Over a Century

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Automatic control of all factors

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sure filters, aseptic vial fillers, ovens and incubators, push-button pH, high-speed angle centrifuge, electro-balance, and flexible heating tape. No. 28, 16p.—*Scientific Glass Apparatus Co., Bloomfield, N. J. (196P)*

Laboratory Glassware

Catalogs very comprehensive offering of laboratory glassware. Catalog TG-15, 234p.—*Kontes Glass Co., Vineland, N. J. (199A)*

Latest Lab Furniture

Bulletin depicts and catalogues new design in laboratory furniture. Equipment is built on modular principle. Supplement 55-A, 10p.—*Metalab Equipment Co., Hicksville, L. I. (199B)*

Variety of Connectors

Describes metal connectors, glass or metal sockets, plastic seals, metal tubing, metal couplings, and plastic connectors, and diagrams their use for gas and liquid flow systems in lab analysis. *Bulletin 832, 4p.—Burrell Corp., Pittsburgh. (199C)*

Electric Shakers

Describes line of reciprocating and rotating laboratory shakers, and accessories for mounting different types of glassware. Bulletin 580, 4p.—*Eberbach Corp., Ann Arbor, Mich. (199D)*

Specific-Gravity Unit

Illustrates instrument that supports hydrometer vessels in precise vertical position. Data on vessel sizes and lists of hydrometers are included. Form 2G756, 2 p.—*Royco Instruments, Albany, Calif. (199E)*

Lab Freeze-Drying Units

Describes automatic freeze-drying equipment, new types of tray dryers, manifold-type freeze-dryers with faster speeds and greater capacities, and combination units that can be used for either manifold or tray freeze-drying. 4p.—*Arthur S. LaPine & Co., Chicago. (199F)*

Steel Furniture

Details specifications for over two dozen interchangeable laboratory furniture units. Handy section is devoted to instructions on laboratory planning. Bulletin FS-227, 24p.—*Fisher Scientific Co., Pittsburgh. (199G)*

Water Bath Accessories

Data sheet describes unit that combines heater, stirrer, and circulator with built-in pneumatic control system, and temperature indicator for water bath. Also covers water bath cooler and insert type polyethylene fittings. 6p.—*Arthur S. La Pine & Co., Chicago. (199H)*

Sample Splitter

Describes line of precision built splitters designed for sampling fine materials that segregate easily. Covers design and construction, and provides complete capacity data. Bulletin SFB-103, 2p.—*Carpco Mfg., Inc., Jacksonville, Fla. (199I)*

Reference Supplement

First supplement to booklet "Selected Scientific and Engineering Tables and Data" has such new tables as recipe conversions, composition and value of foods, coefficient of linear expansion, and report writing information. The original book has 112 pages of data. *12p.—United States Testing Co., Inc., Hoboken, N. J. (199J)*

Lab Analytical Tools

Catalogs line of spectrophotometers, monochromators, photometers, vapor fractometers, as well as accessories and components. Also briefs on process control instruments. 16p. — *Perkin-Elmer Corp., Norwalk, Conn. (199K)*

Lab Equipment Line

Shows latest additions to lab equipment line including flask heater with interchangeable baskets, pocket-size pH meter, continuous extractor, and stirrer. Lab-Oratory, January, 1957, 16p.—*Schaar & Co., Chicago. (199L)*

Water Analysis

Furnishes many methods for the analysis of water. Tests are decribed for pH, alkalinity, hardness, turbidity, chloride and others. Bulletin 11, 80p.—*Solvay Process Div., New York City. (199M)*

Particle Size Analysis

Discusses principles of a unit which makes particle size distribution analyses. Cut-away drawings show operation of the machine that can be used for production control or research. 10p.—*Sharples Corp. Research Laboratories, Bridgeport, Pa. (199N)*

TRANSPORTATION

Van Anchoring Mechanism

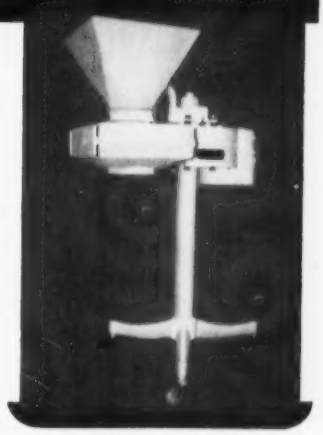
Describes latching unit for fastening vans to flat beds, trailers, or ship decks. 4p.—*Clark Equipment Co., Battle Creek, Mich. (199O)*

Role of Air Freight

Booklet provides review of air freight study published by Harvard Business School. Has case histories. 24p.—*Emery Air Freight Corp., New York City (199P)*

RICHMOND / SPROUT-WALDRON

Gyro-Pedestal Sifters



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- DUST-TIGHT!
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Write For Bulletin 139

These high-speed sifters are designed for handling either batches or streams of free-flowing materials containing small percentages of oversizes. They can be equipped with casters for portability, attached to floor or ceiling, mounted on bench or cabinet, or installed directly into spout or chute. All material – contact points can be made of stainless steel. Capacity – 60 lbs. per minute through 14 mesh. Get details now.

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Manufacturing Engineers Since 1866

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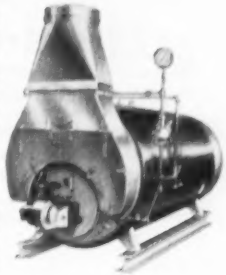
EQUIPMENT FOR SIZE REDUCTION, MIXING & BLENDING, PELLETING & CUBING, BULK MATERIALS HANDLING, PRODUCT CLASSIFICATION

Leffel Boilers Pass The Acid Test:

". . . we have been in the boiler business for nearly fifty years, and the only repair work we have ever done on a Leffel Scotch Marine Boiler has been due to human failing, and not to mechanical failure. The Leffel Scotch Marine Boiler is without a doubt the strongest and most trouble-free boiler built."

Mr. J. J. Bower, President
J. J. Bower Company, Inc.
Roanoke, Va.



No man is in a better position to judge boilers than the man who services and repairs all types and makes. It pays to listen to a man like J. J. Bower for his words are backed by nearly a half-century of experience. In the brief statement above, Mr. Bower cuts away all the claims and promises of most of today's boiler advertising and tells you why *you* should rely on Leffel boilers for your steam requirements.

For more details on why you can count on rugged, reliable Leffel boilers for long life and dependable service, write today for your free copy of Bulletin 236.

THE JAMES LEFFEL & COMPANY

Dept. E

SPRINGFIELD, OHIO

Insure Uniform Quality Cooking

DOUBLE-CHECK with COOK-CHEX

When a Cook-Chex is attached to a retort basket . . . *Anyone* in your plant can double check, at a glance, *two important* facts!

1. **The basket has, or has not, been through the cooking process.**
2. **It has, or has not, been subjected to *proper* cooking conditions.**

These two facts are important to you because they eliminate the usual problems of: a wrong cook schedule, keeping baskets in sequence, and the possibility of "losing" uncooked baskets!

Easy-to-use Cook-Chex signal these essential facts automatically! Cook-Chex, produced with a *purple* chemical ink, turn color to *green* only after your proper cooking conditions have been achieved. Cook-Chex react to precise conditions of temperature, steam and time; and, may be ordered to meet your specific cooking requirements.

Cook-Chex are also excellent as a low cost, permanent record for your cooking-room operations.

Double-check with Cook-Chex to insure uniform quality in your food products. Send for supply of Cook-Chex samples.

ATI COOK-CHEX

Another product by ASEPTIC-THERMO INDICATOR COMPANY

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Please send a FREE supply of Cook-Chex for use with a cooking process of _____ degrees F., for _____ minutes.
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USEFUL NEW BOOKS • GOVERNMENT PUBLICATIONS

Freezing Reference Revised

THE FREEZING PRESERVATION OF FOODS. VOL. 1 (*Third Edition*) *by Donald K. Tressler and Clifford F. Evers. Published by AVI Publishing Co., Inc., Westport, Conn.* 1957 *1214 pages, cloth. Price:* $18.

This completely revised and augmented new edition of a standard reference resulted from the tremendous strides taken by the food industry in the ten years since the second edition. It has been necessary to divide the book into two volumes: one dealing with freezing of fresh foods, the second with the freezing of precooked and prepared foods. (Volume II is expected this month.)

New chapters have been added on dehydrofreezing, freeze drying, vacuum concentration, plant sanitation, warehousing, and other topics. Other chapters have been extensively revised to bring them up to date.

Written by two top authorities of the field, assisted by over 100 food technologists, the book is a must for food men.

Food in Wartime

THE COMBINED FOOD BOARD *by Eric Roll. Published by Stanford University Press, Stanford, Calif.* 1957. *386 pages, cloth. Price:* $7.50.

This interesting volume deals with the board set up by the Allies to coordinate international production, distribution, and consumption of food during World War II. Formed by the United States and Great Britain, the Combined Food Board is interesting as an experiment in international industrial cooperation.

The author traces the development of the system, its structure, and its accomplishments.

Valuable as a study of food and the economic role it plays in wartime.

Nutrition Simplified

ESSENTIALS OF NUTRITION *By Henry C. Sherman. Published by the Macmillan Co., 60 Fifth Ave., New York City,* 1957. *505 pages. Price:* $4.90.

For the food industry management man searching for a readable and authoratative guidebook to nutrition and dietetics, this book is the answer. It assumes no formal training in the science and yet offers its reader a comprehensive briefing in the terminology of nutrition.

This fourth edition has been completely revised to bring to the reader the latest advances and theories in the field.

British Food Plants

FOOD DIRECTORY—1957-8. *Published by Tothill Press, Ltd., 33 Tothill St., London, S.W. 1. 838 pages, cloth. Price:* 41 *shillings* (*about* $6.15).

The latest guide to the food industry in Great Britain includes complete listings of processors, equipment manufacturers, suppliers, and consultants. Also offered is up-to-date information on food standards and regulations.

Though it deals primarily with British plants, the book provides some data on Australian, Asiatic, and African branches.

Booklets and Reports

POULTRY PLANT SANITATION (*Supplement*) *Published by Institute of American Poultry Industries, Chicago* 2. 1957. *80 pages. Price:* $1.25. Working handbook for sanitarians and plant workers.

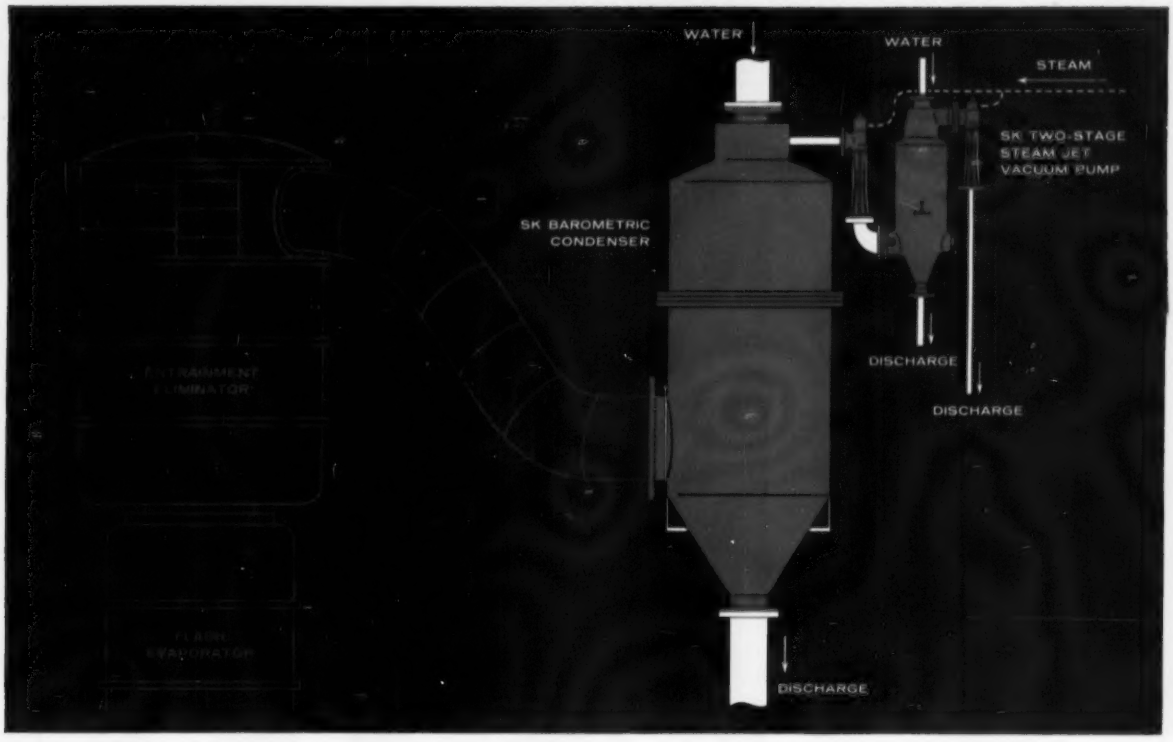
SUGGESTION PLAN GUIDE. *Published by Society for Advancement of Management, New York City* 11. 1957. *24 pages. Price:* $1.50. Manual of successful policies and procedures now in use.

ANNUAL REPORT: NATIONAL BUREAU OF STANDARDS. (*Publication* 220). *Published by U. S. Government Printing Office, Washington* 25, *D. C.* 1957. *158 pages. Price:* $.60. Summary of bureau's research and development activities during 1956 fiscal year.

Additives Hazard

—*Continued from page* 113

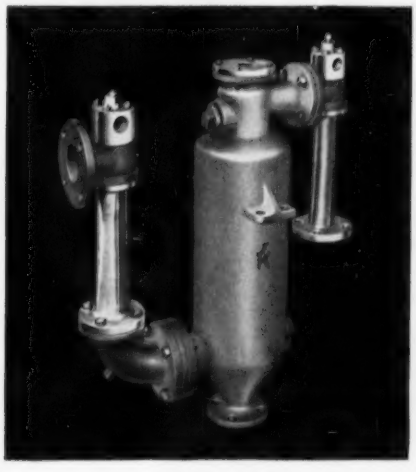
From time to time, if need ever arises, Congress can take another look at the results of simple legisla-



SK VACUUM PUMP HELPS BEVERAGE COMPANY

make better product at lower cost

SK Two-Stage Condensing Steam Jet Vacuum Pump



SK Steam Jet Vacuum Pumps utilize the kinetic energy of pressure steam to entrain and remove gases and vapors. Because they offer outstanding advantages—simple design with no moving parts, low initial cost, and long life expectancy with little supervision or maintenance—they have opened a whole new field for application in the food and allied industries.

A typical example is shown above. This is part of a refined, improved process developed by a popular beverage manufacturer for handling product. The two-stage steam jet vacuum pump illustrated consists of two exhausters with a barometric counter-current intercondenser. It is used to maintain an absolute pressure of approximately 1 inch of mercury on a system consisting of a single effect evaporator together with an entrainment eliminator and an SK barometric counter-current pre-condenser. The condensable vapors are removed in the pre-condenser and the two-stage vacuum pump handles the non-condensable gases plus moisture of saturation. Two single-stage exhausters are used on a section of the process not shown to maintain vacuum on a deaerator and a holding tank.

The improved process is outstanding in increased efficiency and control of product. And the SK Vacuum Pump has helped make it so.

Many sizes of Vacuum Pumps are carried in stock by SK and are available for immediate delivery. For material on Vacuum Pumps and for information on other types of SK Jet Apparatus, write for a copy of Bulletin J-1.

JET APPARATUS: Ask for Condensed Bulletin J-1.
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tion and can add the new instructions as required.

Congress Worried!

The extravagant complaints and obvious conflict of interest in these matters is evident to Congress. It could hardly be otherwise. And Congress has started to do something about it.

A new subcommittee of the House Committee on Interstate & Foreign Commerce has been named to find out more about the ways in which FDA (among others) is administering the law.

One statement of the Committee plan goes so far as to ask "whether the law and the statutory standards it contains have been and are being interpreted by rule, or internal procedures, to enlarge the area of regulation beyond that intended, and to administer it through procedures not intended by the Congress."

The special subcommittee intends to review past practice and redetermine the intent of Congress. This will permit a definite finding as to whether the *per se* doctrine is a valid and intended transfer of power from Congress to an administrative agency.

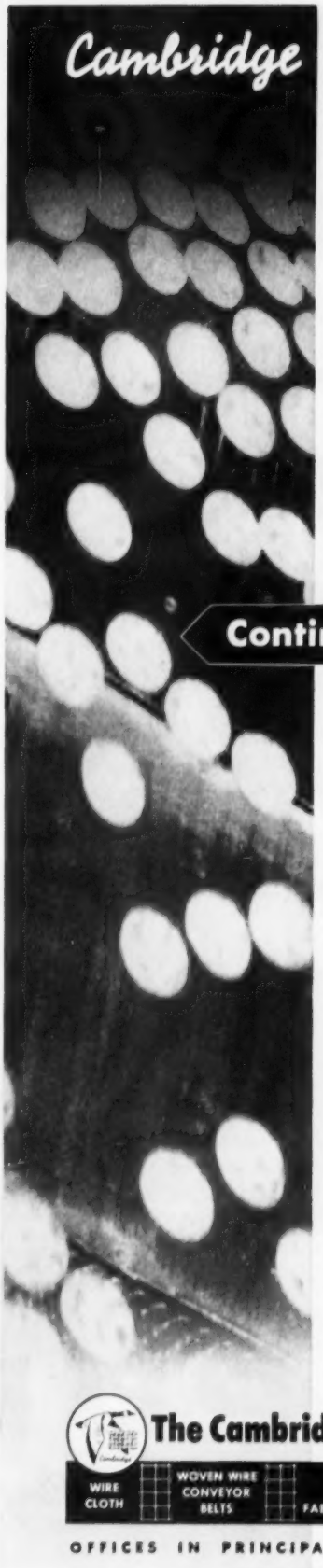
The Commissioner of Food & Drugs pointed out in a recent address "that we have never had a 'per se' rule against added poisons in the sense of an absolute prohibition."

But many past cases raise the question whether there has not been the practice of using the per se doctrine, with occasional very significant hardship on industry and disadvantage to the public. In fact, in one other public statement the Commissioner said that Congress had ordered absolute safety. That, of course, is nonsense.

FDA has been remarkably free from bigoted bureaucracy. But its dealing with scamps inevitably results in excessive suspicion as to motives or actions of even the most responsible persons.

In the third item mentioned above as a legislative need, a simple statement from Congress as to the intended safety yardstick actually will create greater safety. It would take advantage of informed scientific opinion and its full application in practice.

Let us hope that special Congressional action will remove the temptation for excessive zeal. Then progress and safety may be fully protected against the hazards of mere controversy, which perhaps is the most dangerous of all. —*End*



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continuous, low-cost processing, greater uniformity

Whatever the type of product you are processing, moving it on continuous, wire mesh belting through each operation will help increase product uniformity, cut operating costs, reduce manual handling and maintain sanitary requirements. Baked goods, meats, vegetables, fruits or candy are baked, cooked, cooled, washed, blanched or frozen faster and with a minimum of waste or damage. EXAMPLE:

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WIRE MESH BELT carries thousands of crackers through oven in a continuous stream. Open mesh permits heat to circulate freely around product, giving greater uniformity. Crumbs or waste particles fall through, keeping belt and foods contamination-free.

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WOVEN WIRE CONSTRUCTION gives longer wear because there are no seams, lacers or fasteners to weaken or break.

SPECIAL CROSS FLIGHTS or raised edges are available to hold product on belt during flat or inclined travel.

Cambridge Wire Mesh Conveyor Belts are made in any size, mesh or weave, from any metal or alloy, and can be used under a wide range of conditions . . . hot or cold, wet or dry. Call your Cambridge Field Engineer to discuss how you can get continuous, low-cost processing and greater product uniformity on woven wire conveyor belts. Look for his telephone number under "Belting, Mechanical" in the *Yellow Pages*. Or, write for FREE 130-PAGE REFERENCE MANUAL.

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"OLD-FASHIONED" STEPS — hand kneading and small-lot mixing — have proved to be indispensable in bread-making at Pepperidge Farm. Modern stainless steel equipment, such as the conveyor shown above, is indispensable, too, in meeting demand for increased production.

Stainless Steel Protects "Old-Fashioned Flavor"

Can "old-fashioned homemade flavor" be retained in mass-produced bakery goods? Pepperidge Farm, Inc., offers strong proof that it can, as sales climb on unique combination of ingredients, hand methods, and stainless steel equipment.

STAINLESS STEEL BULK MILK TANKS keep milk ice cold at Pepperidge plants. Whole fresh milk is delivered daily by local dairies. Stainless protects quality and purity from the time the milk leaves the cow until it goes into the dough. Stainless is inert. It never adds unwanted flavor. Never takes anything away.

REPUBLIC

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STRICT POLICY PAYS OFF

An uncompromising policy of maintaining the highest quality and "old-fashioned homemade flavor" has been the basis for success at Pepperidge Farm, Inc. In growing from family-sized batches of bread to sales of over a million loaves each week, the company has never lost sight of its basic intent.

COMBINING THE OLD AND NEW

Pepperidge maintains its high quality and delicious flavor by combining the finest ingredients with some tried and proved hand methods of bread-making. Then they go one step further and utilize the many advantages of modern food processing equipment fabricated from Republic ENDURO Stainless Steel.

This stainless equipment includes ovens, slicers, wrappers, conveyors, bulk milk-coolers, mixers, water-coolers, storage bins. It is used extensively in the company's plants at Norwalk, Connecticut, Downington, Pennsylvania, and Downers Grove, Illinois.

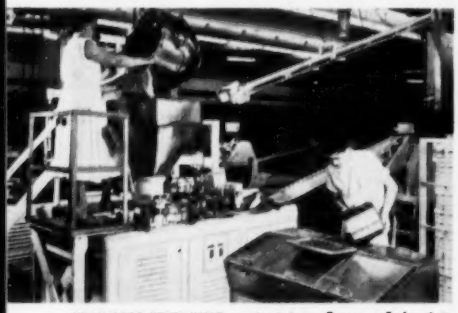
NO LOSS OF FLAVOR

ENDURO-made food equipment eliminates the danger of metallic contamination. Protects the most delicate flavor. Never adds unwanted flavor. It never takes anything away. ENDURO's smooth, hard, dense surface offers little foothold for bacteria or contaminants. The corrosive action of food acids and moisture is locked out.

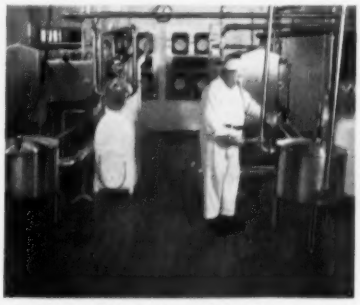
LONG-RANGE ECONOMIES

Food processing equipment made from ENDURO® Stainless Steel is an investment in long-range economies and trouble-free service. It's easy to clean and keep clean. It offers maximum wear-resistance. Holds maintenance to a minimum. Withstands sub-zero cold or blistering heat.

Safeguard your product's quality, flavor and purity by using equipment fabricated from Republic ENDURO Stainless Steel. Your supplier has all the facts. Or send the coupon for more information.



STAINLESS STEEL BINS protect true flavor of dry ingredients used in Pepperidge Farm's bread, "brown and serve" rolls, salt sticks, club rolls, cinnamon buns, and other products. Stainless is easy to clean and keep clean. Easy to sterilize, too.



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Imparts no flavor, odor, or color	YES	YES
Develops no flavor, odor, or color during its stabilizing life	YES	YES
Doesn't cause metal-reactive discoloration of product	YES—Contains Patented* Lecithin-Citrate	YES—Contains** Monoglyceride-Citrate
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Water-soluble	—	YES
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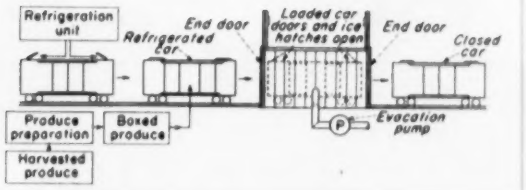

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PRODUCTS

Gelled Condensed Whey Containing Undenatured Proteins, Having 30 to 60% Solids–O. E. Stanberg to Consolidated Products Co., Danville, Ill. No. 2,780,548. Feb. 5, 1957.

Food Product Comprising Cow's Milk Solids, Alcoholized Chitin Prepared by Reacting With Anhydrous Alcohol–P. Gyorgy, Villanova, Pa., R. Kuhn and Friederich Villiken, Heidelberg, Germany to American Home Products Corp., New York City. No. 2,783,148. Feb. 26, 1957.

Starch-Like Milk Pudding Comprising Low Methoxy Pectin, Irish Moss Extract, Alkali Ion–H. W. Block, Orange, J. L. Common, Rutherford, N. J., and J. F. Dreher, New York City to General Foods Corp., White Plains, N. Y. No. 2,784,099. Mar. 5, 1957.

Sugar-Salt Tablet for Flavoring Canning Liquids, Having Sodium Stearate as Die Lubricant, Alkali Metal Phosphate as Sequestering Agent–H. W. Diamond to Morton Salt Co., Chicago. No. 2,784,101. Mar. 5, 1957.

Dough-Sheet Overlapped Upon Itself to Provide Layers, Pull-Strip Frozen into Adherence With at Least one Layer as a Thawing Indicator–N. K. Paxton, Monroe, Utah. No. 2,784,103. Mar. 5, 1957.

Vinegar Product Containing 0.5 to 1% Animal Gelatin as Stabilizer–C. A. Rietz, San Francisco to Rietz Mfg. Co., Santa Rosa, Calif. No. 2,785,073. Mar. 12, 1957.

Frozen Pineapple Product Containing a Stabilizer of Group Including Stannous Chloride and Stannous Sulfate–G. E. Felton to Hawaiian Pineapple Co., Ltd., Honolulu, T. H. No. 2,785,076. Mar. 12, 1957.

Monosodium Glutamate Coated With Carboxymethyl Ether of Modified Dextran–L. J. Novak to Commonwealth Engineering Co. of Ohio, Dayton, Ohio. No. 2,785,977. Mar. 19, 1957.

Fluid Chocolate Coating for Frozen Products Comprising Cocoa Butter, Sugar, Cocoa Solids, and Minor Quantity of Prepared Compound–W. J. F. Gracht, Beasrode, Belgium to Lever Bros. Co., New York City. No. 2,785,978. Mar. 19, 1957.

PROCESSES

Stabilizing Butter-Like Flavor of Fat-Containing Foods by Adding Butyl Alcohol.–D. R. Merker to Swift & Co., Chicago. No. 2,773,772, 12-11-'56.

Producing Canned Sterilized Milk by Subjecting to Partial Vacuum, Elevated Temperatures, Homogenizing, Sterilizing, Canning.–R. R. Graves, Valparaiso, Ind. to Graves-

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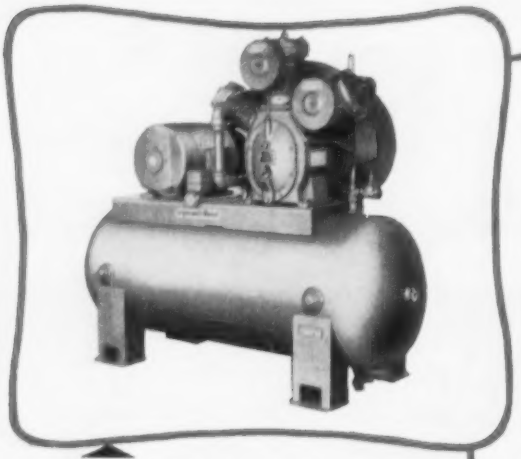

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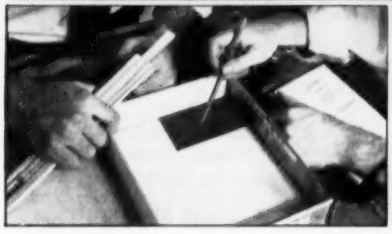

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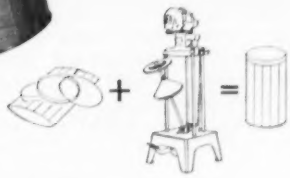

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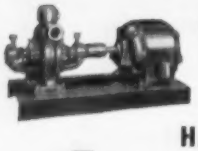

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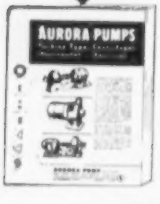

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Stambaugh Corp. No. 2,772,979. Dec. 4, 1956.

Making Spice by Grinding in Presence of Fibrous Material to Avoid Gummy Consistency.—H. R. Ansel to Wm. J. Stange Co., Chicago. No. 2,772,977. Dec 4, 1956.

Contacting Acylase-Bearing Kidney Tissues With Water and Monohydroxyalkase, Separating Acylase—W. M. Thompson and L. A. Graham, Chicago and R. J. Seidel, Des Plaines, Ill. to Armour & Co., Chicago. No. 2,769,749. Nov. 6, 1956.

Picking Poultry Back Feathers by Applying Lateral Force to Carcass During Movement—R. I. Lentz and D. B. Van Dolla to Swift & Co., Chicago. No. 2,782,457. Feb. 26, 1957.

Brewing Beer for Diabetics by Applying Maltose From Start of Mashing to Wort, Maintaining Mashing Temperature at Least 1 hour, Clarifying, Cooking, Adding Hops, Cooling, Separating Draff, Adding Diastase—I. F. F. E. Pauls, Basel, Switzerland, and R. R. A. Quatz, Gottingen, Germany. No. 2,783,147. Feb. 26, 1957.

Producing Coffee Extract by Subjecting Ground Coffee to Cold Water and CO_2—A. A. Epstein, to V. de B. Epstein, Carmel, N. Y. No. 2,783,149. Feb. 26, 1957.

Mixing Wheat Flour With at Least One Part by Weight of Glucose Oxidase—H. G. Luther, Baldwin, N. Y. to Charles Pfizer & Co., New York City. No. 2,783,150. Feb. 26, 1957.

Treating Triglyceride Oils to Prepare Hard Butter by Rearranging Mixture of Oils, Hydrogenating—C. M. Cochran, Highland Park, Ill. and M. L. Ott, Chicago to The Glidden Co., Cleveland. No. 2,783,151. Feb. 26, 1957.

Inhibiting Coconut Meat Discoloration by Contacting Inner Surface with Sulfur-Dioxide—B. B. de Maya, Allendale, and A. A. Winston, Hillside, N. J. to General Foods Corp., New York City. No. 2,783,152. Feb. 26, 1957.

Producing Jellies Continuously by Pre-Cooking a Mixture of Fruit Juice, Sugar, Pectin and Sodium Citrate, Concentrating, Adjusting pH—H. Lebeson, Winnetka, Ill. No. 2,783,153. Feb. 26, 1957.

Improving Cooked Food Products by Removing Moisture From Gel Prior to Introducing Into Hot Oil—E. J. Riboche, Washington, D. C. No. 2,783,184. Feb. 26, 1957.

Producing Aerated Chocolate Continuously by Heating, Delivering to Heat Exchanger and Agitator, Introducing Non-Soluble Gas, Chilling, Extruding—D. R. Ciccone, Montclair, to Charms Co., Bloomfield, N. J. No. 2,784,096. Mar. 5, 1957.

Making Caramel Color From Solution of Starch Hydrolysis Products by Adding Alkali, Heating, Adding Acid, Carmelizing—R. E. Pyle and J. B. Longenecker, Granite City, Ill. to Union Starch & Refining Co., Columbus, Ind. No. 2,784,118. Mar. 5, 1957.

Cleaning Shrimp by Slitting Shell, Spreading Slit, Removing Shrimp Meat—G. Johnson, Lake Forest, Ill. No. 2,784,450. Mar. 12, 1957.

Freezing Ice Cream by Depositing Units on Heat-Conducting Table, Spraying Table and Units With Refrigerant, Moving Units Through Pool of Drained Refrigerant—J. L. Reynolds, Richmond, Va. No. 2,784,567. Mar. 12, 1957.

Preparing Pre-Cooked Puffed Brown Rice Cereal by Soaking in Water, Cooking, Drying, Subjecting to Hot Air Blast—E. B. Kester, Berkeley and R. E. Ferrell, Richmond, Calif. to USDA. No. 2,785,070. Mar. 12, 1957.

Making Quick-Setting Gelatin Dessert by Adding Boiling Water. Adding Ice, Removing Excess Ice.—W. A. Mitchell, Lincoln Park, N. J. to General Foods Corp., White Plains, N. Y. No. 2,785,072. Mar. 12, 1957.

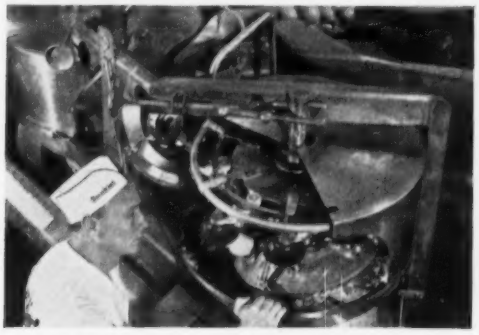
Quick-Freezing by Applying Aqueous Hydrophilic Polymer Under Reduced Pressure—G. J. Malecki, Wellsley Hills, Mass. No. 2,785,075. Mar. 12, 1957.

Preparing Dehydrated Products From Liquids by Concentrating, Incorporating Gas, Vacuum Drying—V. F. Haufman, Lafayette, Calif. to USDA. No. 2,785,077. Mar. 12, 1957.

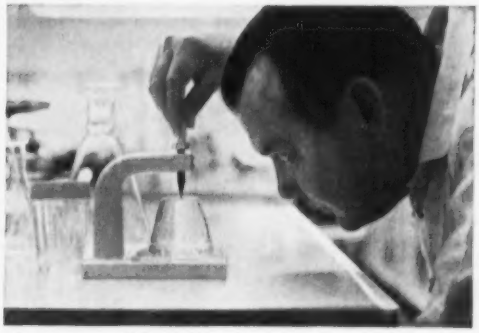
Preparing Edible Container for Frozen Confection by Precooking Cereal Flour and Water, Flowing Into Mold, Baking, Toasting—E. L. Washburn, Mundelein, Ill. to Illinois De-

One look at the huge, sprawling buildings at one of the Exchange Products plants and you know that big things are happening inside. For here *citrus* is king. Trucks pour in with fresh fruit from groves all over California and Arizona. Conveyer belts hum along in every direction. And Exchange products are shipped to nearly every part of the world.

Why 'Exchange' products serve you better



Utmost cleanliness is the watchword at Exchange Products plants. Everything has that "just washed-down" look. Every four hours, extraction equipment is completely cleaned. Every third day, the entire plant closes down for a thorough washing.



Exchange quality is assured by constant checking in extensive testing laboratories. In fact, rigid quality controls have been set up *throughout* the plant to make sure that every product measures up to Exchange quality. Sunkist produces more than 400 different citrus products.

The world's largest citrus research department is maintained by the Sunkist Growers to develop new growing methods, to improve manufacturing processes, and to perfect better products. Today, with a backlog of more than 60 years experience, Sunkist has accounted for 118 separate U.S. patents.

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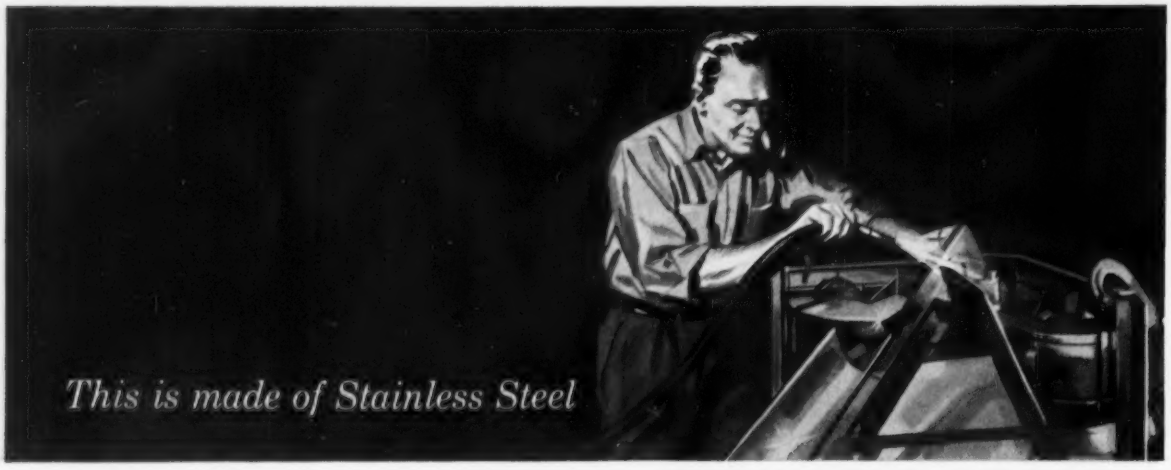
Exchange Lemon Products Co., Corona, Calif. • Exchange Orange Products Co., Ontario, Calif.



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The speed at which food must be processed today means there is literally no time for slow, difficult cleaning of equipment. There's no time for replacing worn, rusted, or corroded equipment either. It's by saving time here that Crucible stainless has made its impact on today's swiftly-moving food processing industry. Crucible stainless is not only the fastest material to clean in the business, it easily withstands harsh cleaning chemicals that speed up the process but often attack other metals.

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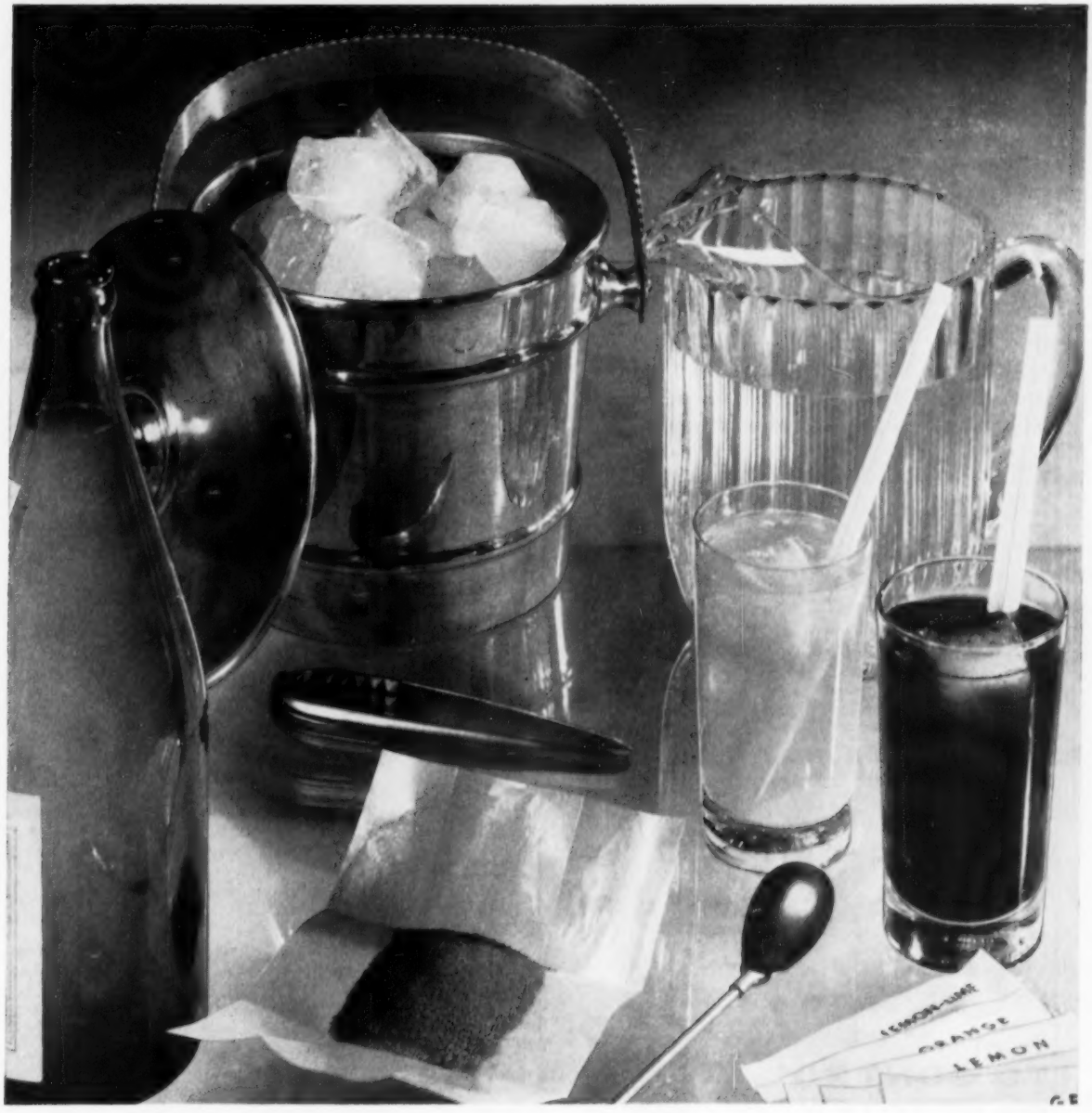

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velopment Laboratories, Inc., Chicago. No. 2,785,980. Mar. 19, 1957.

Proofing and Baking Bread by Disposing Dough in Environment of 90F., Increasing to Baking Temperature—P. S. Ward, Cynthiana, Ky. No. 2,785,642. Mar. 19, 1957.

Manufacturing Carrot Product by Comminuting, Adding Starchy Binder, Extruding Into Deep Frying Oil—L. Dinesen, Minneapolis. No. 2,785,981. Mar. 19, 1957.

Decolorizing Sugar Solution With Porous Quaternary Ammonium Anion Exchanger—F. H. Harding, Manhasset, and F. Bruder, Ozone Park, N. Y. to Rohm & Haas Co., Philadelphia. No. 2,785,998. Mar. 19, 1957.

Adding Flavoring by Drawing Vacuum on Absorbent Material, Introducing Flavorings, Releasing Vacuum—J. A. Musel to Baltimore Spice Co., Baltimore. No. 2,786,766. Mar. 26, 1957.

Preserving Meat by Introducing Antibiotic Into Vascular System—F. E. Deatherage, Columbus, Ohio. No. 2,786,768. Mar. 26, 1957.

EQUIPMENT

Dough-Treating Device With Conveyor Formed by Succession of Adjacent Rollers, Drive Means, Dough-Engageable Wheel Adapted to Press Downward on Dough Pieces—H. C. Rhodes, Portland, Ore. No. 2,767,666. Oct. 23, 1956.

Powder-Dispensing Apparatus for Protecting Hygroscopic Material from Atmospheric Contacts—V. R. Vernig to Food Machy. & Chemical Corp., San Jose, Calif. No. 2,770,396. Nov. 13, 1956.

Plastic Milk-Case Integrally Molded as a Thin Shell.—A. W. Knieriem, Pasadena, and L. C. Folst, Los Angeles to Calresin Industries, Inc., Los Angeles. No. 2,773,624. Dec. 11, 1956.

Eviscerating Unit Comprising Carcass Supporting Stage, Claw Pivotally Mounted on Adjacent Stage for Arcuate Movement Downward Towards Stage—S. J. Ograbisz, Hamburg, N. Y. No. 2,774,101. Dec. 18, '56.

Bottle-Washer Divided Into Lower Soaking Basins and Succession of Upper Chemical and Fresh Wattle Bottle-Washing Zones.—E. A. Ladewig to A. Ladewig Co., Company, Waukesha, Wis. No. 2,774,361. Dec. 18, 1956.

Centrifugal Olive-Washer and Separator Comprising Rotary Basin, Feed Water Means, Casing, Perforated Metal Sheet, Water Outlet in Casing.—G. Diefenbach, Monza, Italy. No. 2,774,478. Dec. 18, 1956.

Corn-Cracking Apparatus With Yieldingly Mounted Roll For Passage of Foreign Objects.—A. W. and G. A. Rassmussen, Tekamah, Nebr. No. 2,774,544. Dec. 18, 1956.

Alimentary-Paste Die Construction Comprising Series of Openings.—S. Lenner, Milan, Italy. No. 2,775,214. Dec. 25, 1956.

Spaghetti-Cutting Machine for Simultaneously Cutting Bights or Elbows From Strands Looped About a Rod.—A. Curioni, Palisades Park, N. J. to Himself and F. Mariani, New York City. No. 2,775,215. Dec. 25, 1956.

Egg-Separator Comprising Elongated Frame, Yolk Tray Pivotally Mounted Adjacent Top of Frame, Yolk Receiving Trough, Egg-White Receiving Cups Mounted on Same.—P. Christen, Philadelphia. No. 2,775,277. Dec. 25, 1956.

Peach-Pitter Having Pitting Head Comprising Peach Half Pit-Engaging Means.—E. R. Anderson, Campbell to Filper Corp., Richmond, Calif. No. 2,775,278. Dec. 25, 1956.

Drupe-Pitter, Including Gripping Devices Accommodated to Variations in Contours of Drupe Halves.—J. Perrelli to Filper Corp., Richmond, Calif. No. 2,775,279. Dec. 25, 1956.

Anti-Foaming Attachment Comprising Enlarged Casing Secured to Valve, Loosely-Mounted Perforated Plates.—E. P. King, Three Oaks to C. Daniel, R. W. Peterson, and Elgin Milk Products Co., Galien, Mich. No. 2,775,486. Dec. 25, 1956.

Vat-Strainer for Draining Whey From Cheese Curd Comprising Tray to Hold Curd, Tray-Support Frame, Reciprocating Carriage, Agitator—A. E. Nessler, Evanston and J. G. Hartman, Wilmette, Ill.

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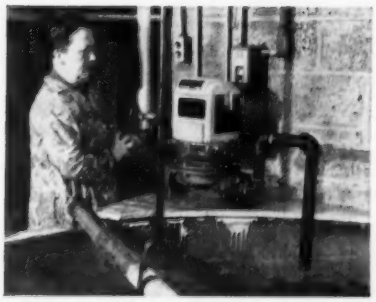

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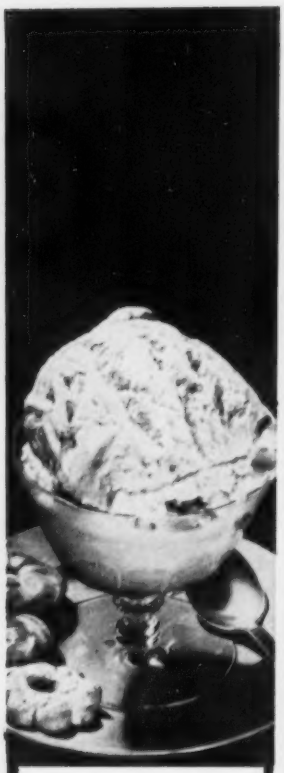

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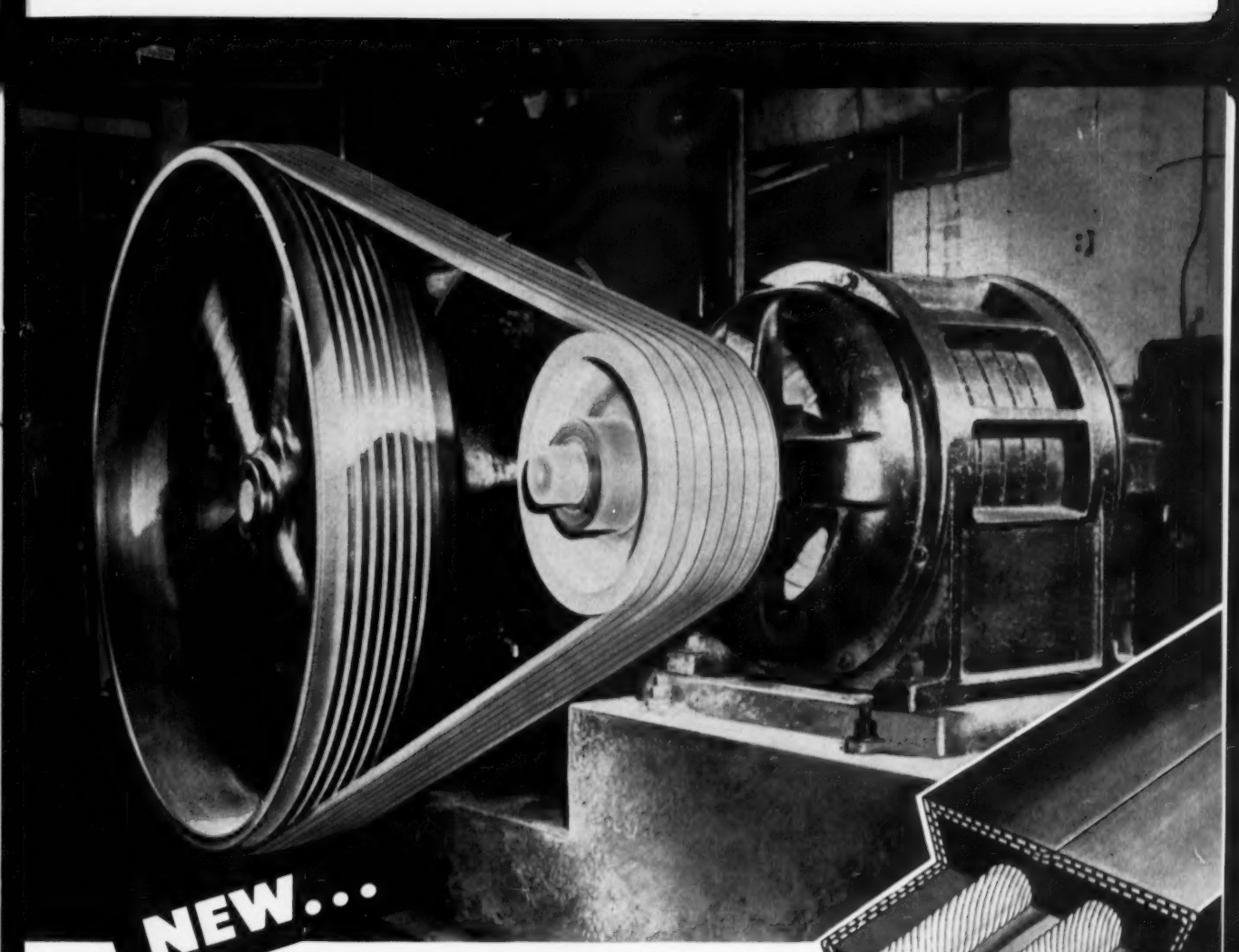

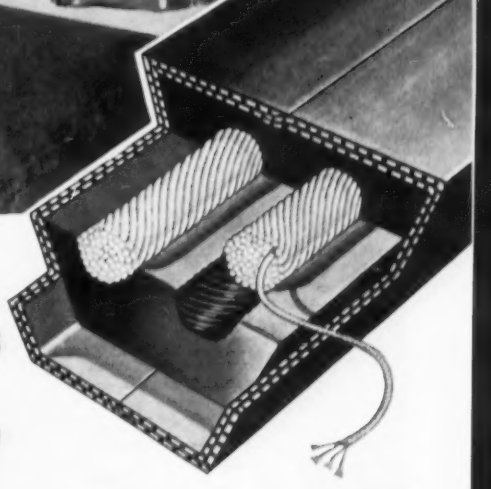

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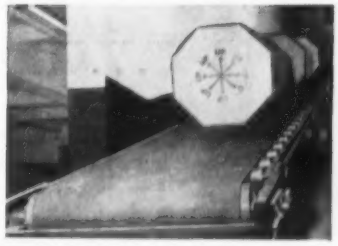

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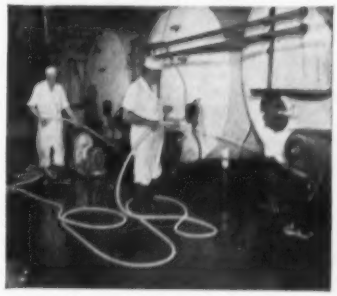

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to Kraft Foods Co., Chicago. No. 2,774,140. Dec. 18, '56.

Produce Cooling Device Having Vents, Vacuum Chamber, Carriage.—M. Kasser, Roseville, Calif. No. 2,774,230. Dec. 18, 1956.

Oil-Separating Pan Adapted for Cooperation With a Citrus Juice Extractor.—C. Hall, Los Angeles. No. 2,774,297. Dec. 18, 1956.

Ravioli Unit Comprising Die Roll Having Mold Cavities, Material-Applying Means, Filling-Material Nozzle, Cover-Material Applying Means.—L. G. Lombi to E. L. Lombi, West Englewood, N. J. No. 2,774,313. Dec. 18, 1956.

Variegators, Providing Passageway for Edible, Flowable, Pasty Matrix Materials, Variegating Material Introducing Means.—F. T. Moser, Easton, Pa. to American Food Laboratories, Inc., Brooklyn, N. Y. No. 2,774,314. Dec. 18, 1956.

Cone-Making Machine Comprising Movable Chain of Waffle Irons For Baking Wafers to be Rolled Into Cones.—A. A. Heyman to Maryland Baking Co., Baltimore. No. 2,774,315. Dec. 18, 1956.

Cranberry Puncturing Machine Employing Support, Transverse Conveyor, Roller, Cylindrical Piercing Drum, Horizontal Stripping Wire—K. G. Weckel, Madison, Wis. and J. D. Hume, Mendota, Ill. No. 2,783,803. Mar. 5, 1957.

Chocolate Tempering Unit Consisting of Semi-Cylindrical Chamber, Jacket, Feeding and Working Compartment, Means for Cooling Wall of Feeding Compartment, Agitator Adapted to Scrape Set Chocolate From Wall and Mix With Main Mass—W. D., and G. Meagher, St. Annes-on-Sea, England. No. 2,784,095. Mar. 5, 1957.

Frozen Confection Unit Employing Rotary Refrigerated Table for Depositing Candy, Deflecting Means—J. L. Reynolds, Richmond, Va. No. 2,784,566. Mar. 12, 1957.

Crab-Cleaning Machine Having Belt With Upstanding Projections to Engage Crabs, Shoe Means to Clamp Crabs as Blades Separate Backs From Bodies, Brush to Remove Gills, Sprinkler—W. A. and E. A. Thompson, Theodore, Ala. No. 2,784,447. Mar. 12, 1957.

Meat-boning Apparatus Having Feed Hopper Embodying Soft Rubber Baffles, Shot Propelling Mechanisms—C. Beatty, Monroeville, Pa. No. 2,784,446. Mar. 12, 1957.

Frigid Confectionery Stringing Machine Employing Belt Carrying Rows of Candies, Stringing Elements Positioned to Engage Each Candy—G. A. Lorentzen, Arlington to W. F. Schrafft & Sons Corp., Charlestown, Mass. No. 2,785,649. Mar. 19, 1957.

PACKAGING

Cheese Packaging Unit Having Receptacle Mounting Means on Conveyor, Vacuum Pipe for Holding Receptacle Flaps Aside to Facilitate Filling—F. H. Stark, Wauwatosa, Wis. No. 2,784,542. Mar. 12, 1957.

Sanitary Liquid Container Comprising a Square Tubular Fiber Body and Triple Thickness Flat Top Having a Thin Filling and Dispensing Opening—H. M. Hill, Port Washington, N. Y. to American Can Co., New York City. No. 2,784,893. Mar. 12, 1957.

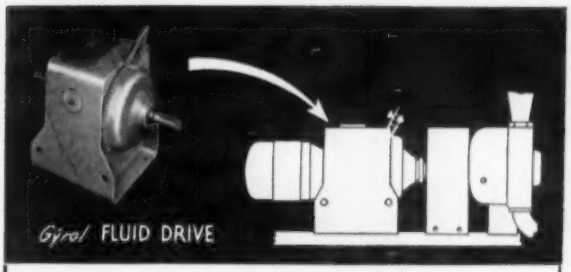
Canning by Filling Thin-Walled Container, Elevating Temperature, Evacuating, Sealing While Hot, Cooling Rapidly, Mechanically Indenting—J. A. Pickens, Earley, S. C. No. 2,785,986. Mar. 19, 1957.

Infusible Coffee Bag Comprising Similar Paper Webs, Having Sufficient Strength to Withstand Boiling Water, Sealed Face-to-Face—M. Weisman, Newton, Mass. to Modern Coffees Inc., Boston. No. 2,786,761. Mar. 26, 1957.

Can Detector Responsive to Temperature of Side Seam Cement to Insure Against Making Can Bodies Without Cement—N. Geertseen, Oak Park, Ill. to American Can Co., New York City. No. 2,787,240. Apr. 2, 1957.

Refrigeration Package With Non-Conducting L-Shaped Strip to Insure Circulation of Air Between Adjacent Packages—M. J. Lang to Refrigeration Package Spacers, Inc., New York City. No. 2,787,407. Apr. 2, 1957.

Potato Chip Packing Machine Having Feed Means, Scale Bucket—W. J. Reynolds to Walter J. Reynolds Co., Portland, Ore. No. 2,787,436. Apr. 2, 1957.



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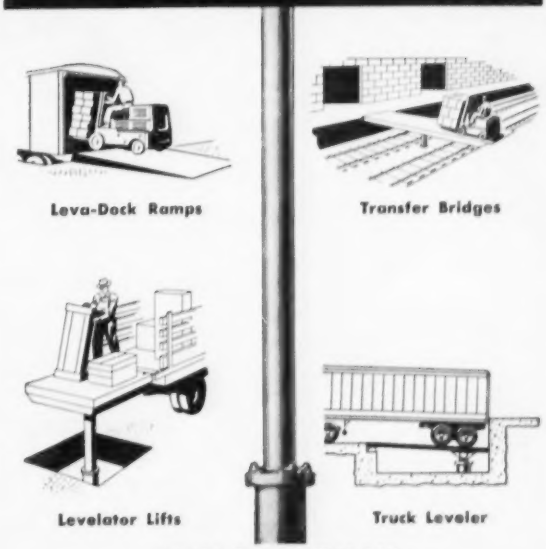

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A fine salary and future is waiting for the proper individual. Salary commensurate with experience. Submit detailed resume giving full details of experience and salary requirements in first letter. Replies will be held in absolute confidence.

Please send replies to

P-4997 Food Engineering
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Design Engineer—Outstanding opportunity for professional advancement with well-established, expanding firm in Dallas, Texas. BS Degree required with minimum of three years' practical experience in mechanical design and development—preferably of light process or materials handling equipment. Company's products are used internationally in chemical, food, and agricultural processing. Experience in one or more of these industries will be helpful. Salary commensurate with experience and proven ability. Send resume including age, experience, and salary requirement to Box P-4066, Food Engineering.

Mechanical or Civil Engineer position available recent graduate who prefers the diversified responsibilities of staff position with a well established growing business. P-4858, Food Engineering.

Flavor Chemist to handle research development, quality control and production of products. Give full details, experience, age, etc. Include photo if available. P-5148, Food Engineering.

Laboratory serving diversified clients wants to add to its staff a man qualified in microanalytical examination of foods. Familiarity with F.D.A. techniques helpful. Additional ability in bacteriology work would be further help. Plenty of room for growth within our organization. Location in the East. Please reply in detail to P-5174, Food Engineering.

EMPLOYMENT SERVICE

Salaried Personnel, $5,000-$30,000. This confidential service established 1927 is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F., P. O. Box 674, Manchester, Vermont.

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Mechanical Engineer—over 20 years diversified experience, 10 yrs. in management. Seeks position as packaging division, in Food, Confectionery, or Related Industry. PW-4803, Food Engineering.

A Swedish Dairy Engineer, age 44, many years experience in production of butter, cheese, milk-powder, concentrated milk. In quality control, 12 years as plant manager in Sweden, desires position with a future in USA or Canada. PW-4955, Food Engineering.

Sales Engineer—Supervisor, B.S. Food Technology. Present position successful process machinery development, field testing, selling. Familiar with all phases dairy and fruit cannery operation, both mechanically and technically. Age 35, married, children. Desire west location with progressive organization with potential. PW-4964, Food Engineering.

Food Technologist—Executive, age 37, experienced canning, processing, byproducts, desires responsible position which can use sound technical background and executive experience. Now Technical Director, small company. PW-5080, Food Engineering.

Baking technologist desires situation with manufacturer of basic or specialty ingredients, for development, evaluation, customer service. Heavy prepared mix background. Knowledge of commercial biscuits and crackers. PW-4811, Food Engineering.

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Man with excellent background in all phases of prepared mix technology, formulation, production, wishes to connect with person or company having capital and sales set up, as partner or staff member. BO-4812, Food Engineering.

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3—Bird T316 St. St. Continuous Centrifugals 32" x 50", 40" x 60".
2—Pneu. Scale 6 head capper, 53 mm.
2—Filler Machine Co., 4 cyl. St. St. piston fillers.
5—Sparkler #33-S-28 Filters, Steel body, St. St. plates.
1—Niagara type 316 S. S. Pressure Filter, model 510-28, 500 sq. ft.
2—Flakers, Buffalo 32" x 90".
4—Double Drum Dryers: 42" x 100', 32" x 52".
7—Vac. Shelf Dryers: 55 to 475 sq. ft.
1—St. St. Spray Dryers: 19' Dia.
3—Rotary Steam Tube Dryers, 4' x 30'; 6' x 30'; 6' x 40'.
3—Vacuum Stills, 50, 100, 300 gal. Monel, St. St.
1—Buflovak #6.5 St. St. Double Effect Evaporator, 588 sq. ft.
1—Stokes Type 316 St. St. Double Effect Evaporator, 250 GPH.
1—Conkey Triple Effect Evap. Silicon Bronze, 1900 sq. ft.—UNUSED.
3—Fitzpatrick Comminutors, St. St. models, D. F.
12—St. St. Kettles, Open top jacketed—40 to 250 gal.
2—125 gal. St. St. Jacketed Kettles, Scraper Agit.
1—55 cu. ft. Spiral Ribbon Mixer.
4—Mixers St. St. Double Arm, 5, 50, 75 gal.
1—3000 gal. St. St. Vacuum Tank with coils.
1—3590 gal. Stainless Steel single axle Truck Tank.
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Knapp 8 oz-#10 adjustable Labeler, hi-speed
★ Ferguson top Gluer with 20' comp. unit ★
FMC #50 Pulper, bronze & stainless steel (3)
FMC Tomato Crusher, Stainless steel, 10 HP
★ Redington Cartoner, type 23-D-9 ★
Resina single head Capper, 28 and 38 mm
American 36" x 84" double drum Dryer, 10 HP
★ FMC Model 35 Juice Extractor, 5 HP ★
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Special Lot of Stainless Clad Kettles; Steam Jacketed; 80 gal. capacity
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Dryer: Direct Heat 4' x 20'.
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1	490	10'6"	25'6"
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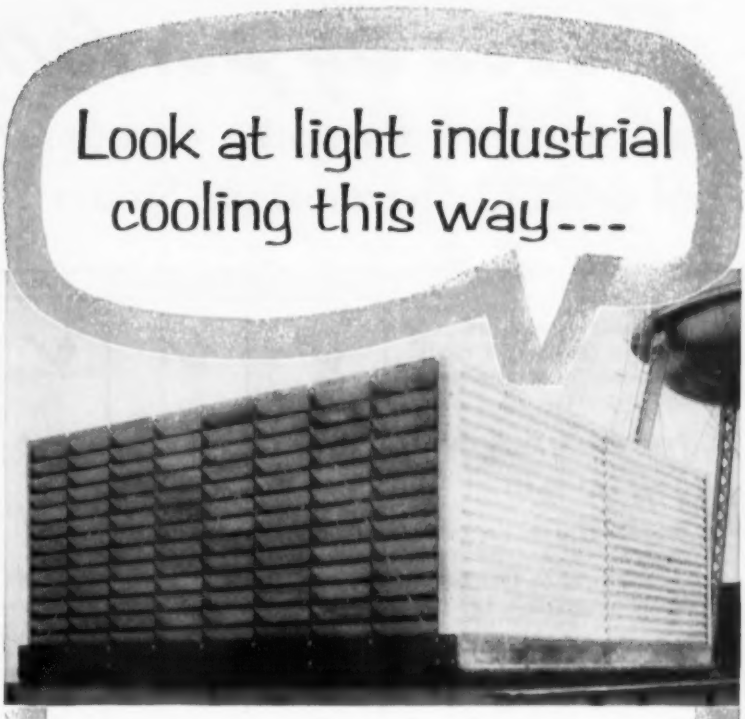

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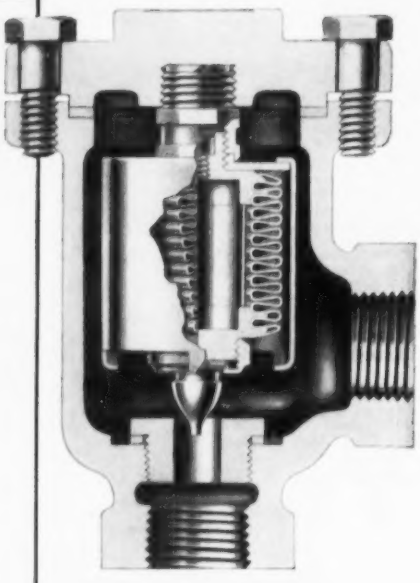

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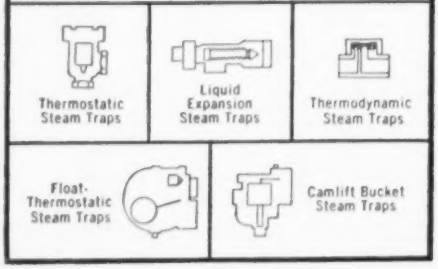

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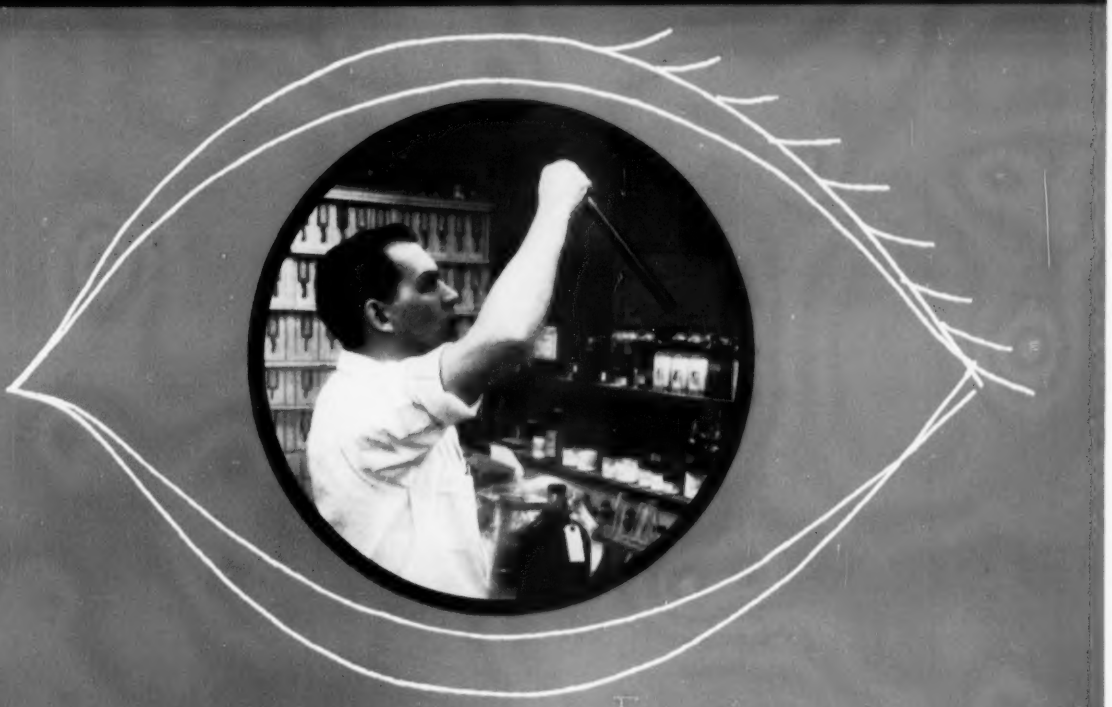

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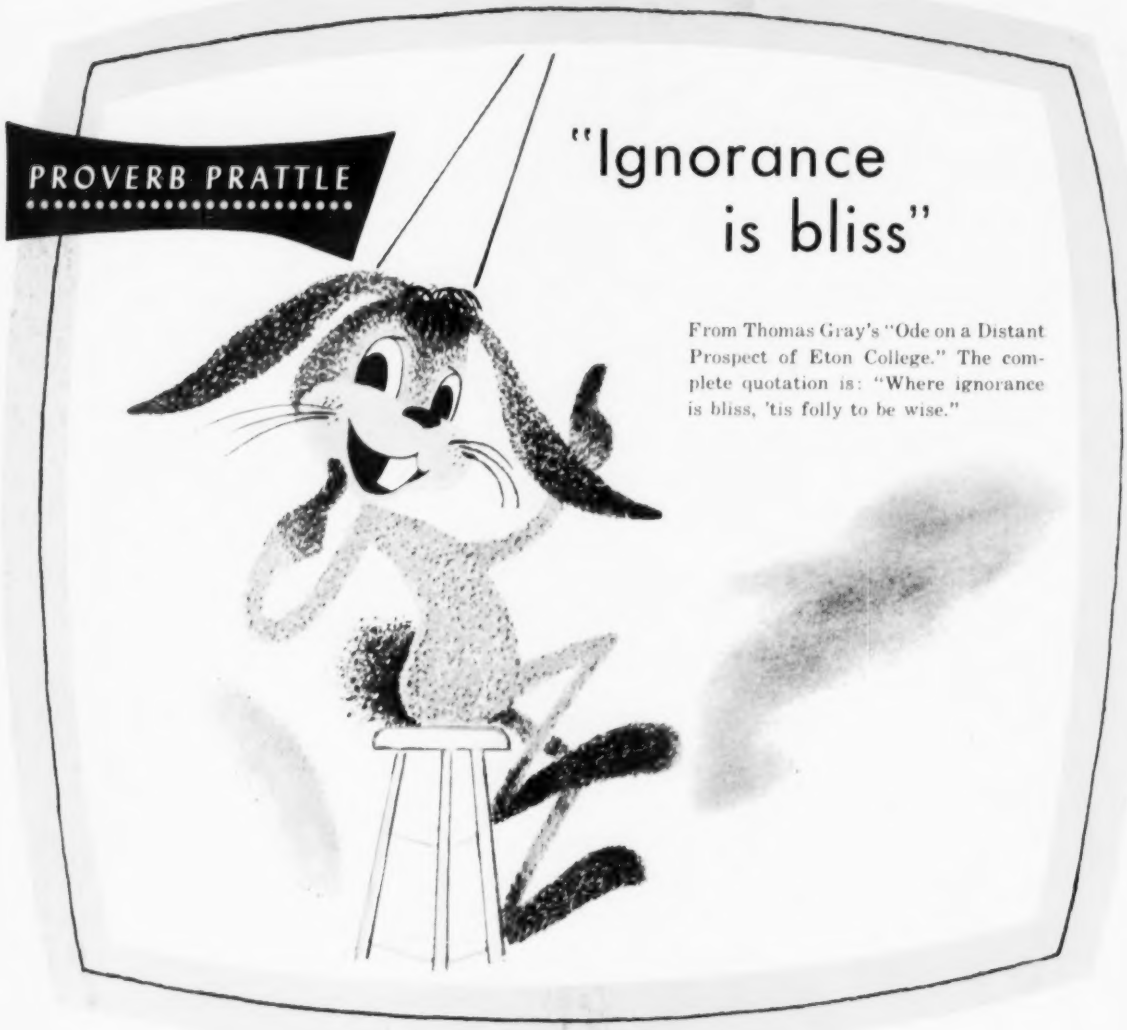
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